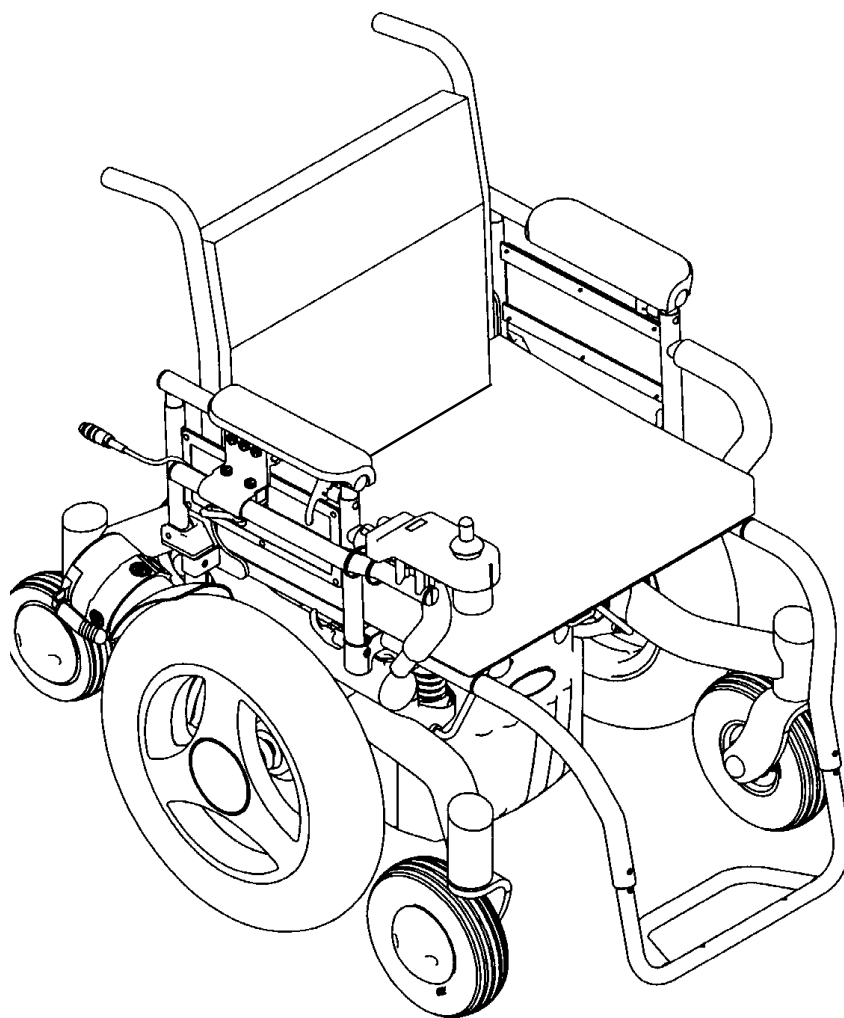


# **Invacare<sup>®</sup> Xterra<sup>™</sup> GT<sup>™</sup> Wheelchair**



DEALER: KEEP THIS MANUAL. THE PROCEDURES IN  
THIS MANUAL MUST BE PERFORMED BY A QUALI-  
FIED TECHNICIAN ONLY



**WARNING**

**THE PROCEDURES IN THIS MANUAL SHOULD ONLY BE PERFORMED BY A QUALIFIED SERVICE TECHNICIAN.**

**DO NOT SERVICE OR OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING THIS MANUAL AND THE OWNER'S MANUAL SUPPLIED WITH THE WHEELCHAIR. IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS, CAUTIONS, AND INSTRUCTIONS, CONTACT INVACARE TECHNICAL SUPPORT BEFORE ATTEMPTING TO SERVICE OR OPERATE THIS EQUIPMENT - OTHERWISE INJURY OR DAMAGE MAY RESULT.**

**SPECIAL NOTES**

**WARNING/CAUTION** notices as used in this manual apply to hazards or unsafe practices which could result in personal injury or property damage.

**NOTICE**

**THE INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.**

**WHEELCHAIR USER**

As a manufacturer of wheelchairs, Invacare endeavors to supply a wide variety of wheelchairs to meet many needs of the end user. However, final selection of the type of wheelchair to be used by an individual rests solely with the user and his/her healthcare professional capable of making such a selection.

**WHEELCHAIR TIE-DOWN RESTRAINTS AND SEAT POSITIONING STRAPS**

Invacare recommends that wheelchair users **NOT** be transported in vehicles of any kind while in wheelchairs. As of this date, the Department of Transportation has not approved any tie-down systems for transportation of a user while in a wheelchair, in a moving vehicle of any type.

It is Invacare's position that users of wheelchairs should be transferred into appropriate seating in vehicles for transportation and use be made of the restraints made available by the auto industry. Invacare cannot and does not recommend any wheelchair transportation systems.

**AS REGARDS TO RESTRAINTS (SEAT POSITIONING STRAPS) - IT IS THE OBLIGATION OF THE DME DEALER, THERAPISTS AND OTHER HEALTHCARE PROFESSIONALS TO DETERMINE IF A SEATING POSITIONING STRAP IS REQUIRED TO ENSURE THE SAFE OPERATION OF THIS EQUIPMENT BY THE USER. SERIOUS INJURY CAN OCCUR IN THE EVENT OF A FALL FROM A WHEELCHAIR.**

**SAVE THESE INSTRUCTIONS**

# TABLE OF CONTENTS

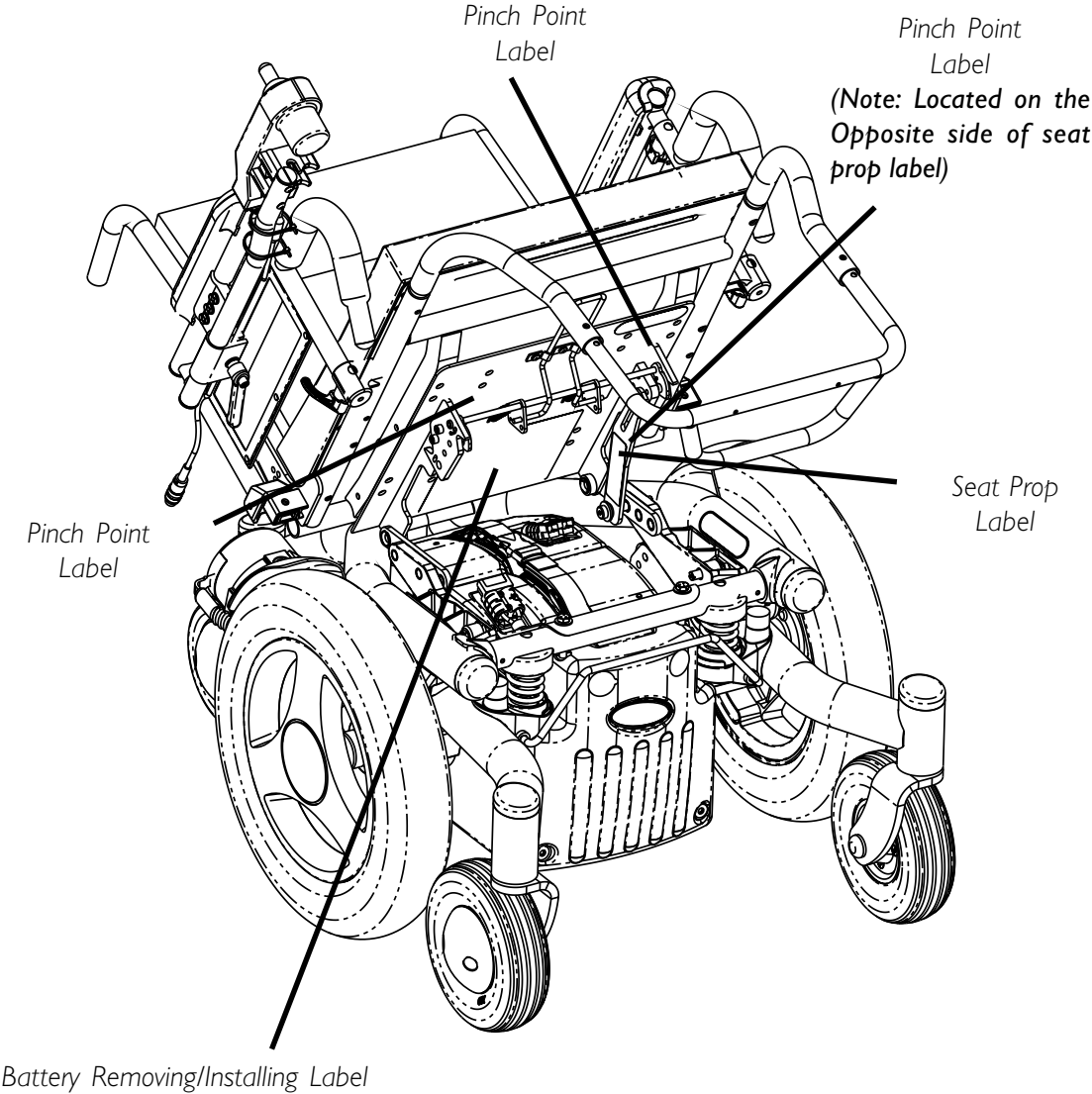
<b>SPECIAL NOTES</b>	<b>2</b>
<b>LABEL LOCATIONS</b>	<b>5</b>
<b>SPECIFICATIONS</b>	<b>6</b>
<b>SECTION 1 - GENERAL GUIDELINES</b>	<b>7</b>
<b>SECTION 2 - TROUBLESHOOTING</b>	<b>9</b>
FIELD LOAD TEST	9
USING HYDROMETER TO CHECK BATTERY CELLS	10
MOTOR TESTING	11
MOTOR BRUSH INSPECTION	11
ELECTROMECHANICAL PARKING BRAKE TESTING	12
<b>SECTION 3 - HARDWARE TORQUE SPECIFICATIONS</b>	<b>13</b>
<b>SECTION 4 - ARMS</b>	<b>17</b>
REPLACING ARMREST PADS - VAN STYLE SEAT	17
REPLACING VAN STYLE SEAT ARMREST PLATE	17
FLIP BACK ARMRESTS	18
<b>SECTION 5 - BACK</b>	<b>20</b>
REPLACING SEAT POSITIONING STRAP	20
REMOVING/INSTALLING BACK UPHOLSTERY	21
CHANGING BACK HEIGHT	23
BACK ANGLE ADJUSTMENT	24
<b>SECTION 6 - SEAT FRAME</b>	<b>26</b>
REMOVING/INSTALLING SEAT FRAME FOR 14 AND 15-INCH SEAT WIDTHS	26
REMOVING/INSTALLING SEAT FRAME FOR 16-INCH SEAT WIDTHS	29
REMOVING/INSTALLING SEAT FRAME FOR 17 AND 18-INCH SEAT WIDTHS	32
REMOVING/INSTALLING SEAT FRAME FOR 19 AND 20-INCH SEAT WIDTHS	35
CHANGING SEAT DEPTH	38
REMOVING/INSTALLING CJ BACK BRACKETS	40
REMOVING/INSTALLING SEAT PAN	41
CHANGING SEAT WIDTH OF FIXED SEAT FRAMES (16, 17, 18, 19, AND 20-INCH WIDE)	45
CHANGING SEAT WIDTH OF ADJUSTABLE SEAT FRAMES (14, 15, AND 16-INCH WIDE)	46
COMPONENT REPLACEMENT FOR 14-INCH, 15-INCH, AND 16-INCH SEAT FRAMES	48
INSTALLING/REMOVING VAN STYLE SEAT/SEAT FRAME ASSEMBLY FROM FLIP-UP SEAT PLATE	50
INSTALLING/REMOVING VAN STYLE SEAT FROM SEAT FRAME ASSEMBLY	51
<b>SECTION 7 - BASE FRAME</b>	<b>52</b>
REMOVING/INSTALLING FLIP-UP PLATE	52
REMOVING/INSTALLING ADJUSTMENT BRACKET	54
REMOVING/INSTALLING FRONT AND REAR SHROUDS	55
REMOVING/INSTALLING TORSION BAR	56
REMOVING/INSTALLING PORT BRACKET	57
REMOVING/INSTALLING BATTERY TRAY	58
REPLACING COMPONENTS OF THE FLIP-UP SEAT PLATE AND/OR CHANGING FROM 3° TILT TO 0° TILT	59

## TABLE OF CONTENTS (CONTINUED)

<b>SECTION 8 - BATTERIES .....</b>	<b>59</b>
REMOVING/INSTALLING BATTERIES .....	59
DISCONNECTING BATTERY CABLES .....	62
CONNECTING BATTERY CABLES .....	64
WHEN TO CHARGE BATTERIES .....	69
CHARGING BATTERIES .....	69
<b>SECTION 9 - ELECTRONICS .....</b>	<b>72</b>
REMOVING/INSTALLING MKIV-A WIRING HARNESS .....	72
REMOVING/INSTALLING MKIV-RII WIRING HARNESS .....	74
REMOVING/INSTALLING MKIV-A JOYSTICK .....	76
REMOVING/INSTALLING MKIV-RII JOYSTICK .....	79
REMOVING/INSTALLING THE MKIV-A CONTROLLER .....	81
REMOVING/INSTALLING THE MKIV-RII CONTROLLER .....	83
<b>SECTION 10 - MOTORS/WHEELS .....</b>	<b>87</b>
REMOVING/INSTALLING DRIVE WHEELS .....	87
REMOVING/INSTALLING DRIVE WHEEL HUB .....	87
REMOVING/INSTALLING MOTOR .....	88
REMOVING/INSTALLING MOTOR/GEARBOX, SUSPENSION ARM ASSEMBLY AND SUSPENSION SPRING HARDWARE .....	91
REMOVING/INSTALLING CASTERS .....	94
<b>NOTES .....</b>	<b>98</b>
<b>WARRANTY .....</b>	<b>99</b>

# **LABEL LOCATIONS**

**LABEL LOCATIONS**



## SPECIFICATIONS

**Seat Width Range:** \*14 to 20-inches

**Seat Depth Range:** \*14 to 20-inches

**Back Height Range:** \*14 to 22-inches

**Back Angle Range:** 80° to 100°  
(in 5° increments)

**Seat-to-Floor (approximate)**  
18-inches @ 3°    17.1/4-inches @ 0°

**Overall Width of Base:  
(w/o joystick)** 25-inches

**Overall Height:** 36-1/4-inches

**Overall Length:** 36-1/2-inches (std)  
40-inches (max.)

**Weight\*\***

**4-Pole Motor**

**Without Batteries:** 179 lbs.

**With Batteries:**  
With ASBA Seat 280 lbs.  
With Van Style Seat 300 lbs.

**Drive Wheels/Tires:  
(Foam Filled or Pneumatic)**  
16 x3-inches  
(Pneumatic -std)  
16 x 3-inches  
(foam filled - opt)

**Battery Type:** 22NF batteries

## PHYSICAL DIMENSIONS

**Casters w/Precision**

**Sealed Bearings**

**Semi-Pneumatic**

Front: 8 x 2 - inches

Rear: 6 x 2 - inches

**Footrests:** Telescoping Front Rigging Supports, Swing-Away, Heavy Duty, 2-in. and 4-in. longer Pivot Slide Tube, Cage

**Armrests:** Flip Back, Fixed or Adjustable Height (Desk and Full Length)

**\*\*A.S.B.A. - Seat Angle Adjustment:** Adjustable (0° and 3°)

**A.S.B.A. - Back Angle Adjustment:** Adjustable (80° to 100° in 5° increments)

**A.S.B.A. - Seat Cushion:** Cushion (Optional)

**A.S.B.A. - Chair Upholstery Options:** Nylon or Vinyl.

**Van Style Seat** - Cloth or Vinyl

**Operating Temperature:**

0 - 122 degrees F

**Storage Temperature:**

10 - 152 degrees F

**Curb Climbing:** 2-inches

**Weight Limitations:** 250 lbs.

NOTE: \*\* A.S.B.A. stands for Adjustable Seat and Back Angle.

## PERFORMANCE

RATING	SPEED	RANGE
250 LBS	Up to 7.5 M.P.H.	Up to 21 Miles

Range will vary with battery conditions, surface, terrain and operator's weight.

\* in 1-inch increments

\*\* - measured without front riggings

<i>This Section Includes the Following:</i>
<i>Repair or Service Information</i>
<i>Operating Information</i>

## REPAIR OR SERVICE INFORMATION

Set-up of the Electronic Control Unit is to be performed **ONLY** by individuals certified by Invacare. The final tuning adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur under these circumstances. The warranty is void if non-certified individuals perform any work on these units.

## OPERATING INFORMATION

### GENERAL WARNINGS

Performance adjustments should only be made by professionals of the healthcare field or persons fully conversant with this process and the driver's capabilities. Incorrect settings could cause injury to the driver, bystanders, damage to the chair and to surrounding property.

After the wheelchair has been set-up, check to make sure that the wheelchair performs to the specifications entered during the set-up procedure. If the wheelchair does **NOT** perform to specifications, turn the wheelchair **OFF** immediately and reenter set-up specifications. Repeat this procedure until the wheelchair performs to specifications.

**DO NOT** operate on roads, streets or highways.

**DO NOT** climb, go up or down ramps or traverse slopes greater than 9°.

**DO NOT** attempt to move up or down an incline with a water, ice or oil film.

**DO NOT** attempt to drive over curbs or obstacles. Doing so may cause your wheelchair to turn over and cause bodily harm or damage to the chair.

**DO NOT** use parts, accessories, or adapters other than those authorized by Invacare.

**DO NOT** leave the power button **ON** when entering or exiting the wheelchair.

**DO NOT** stand on the frame of the wheelchair.

**DO NOT** use the footplates as a platform. When getting in or out of the wheelchair, make sure that the footplates are in the upward position or swing footrests towards the outside of the chair.

**ALWAYS** wear your seat positioning strap.

## TIRE PRESSURE

**DO NOT** use your wheelchair unless it has the proper tire pressure (P.S.I.).

**DO NOT** over inflate the tires. Failure to follow these suggestions may cause the tire to explode and cause bodily harm. The recommended tire pressure is listed on the side wall of the tire.

**GENERAL WARNINGS (CONTINUED)****ELECTRICAL****Grounding Instructions:**

**DO NOT**, under any circumstances, cut or remove the round grounding prong from any plug used with or for Invacare products. Some devices are equipped with three-prong (grounding) plugs for protection against possible shock hazards. Where a two-prong wall receptacle is encountered, it is the personal responsibility and obligation of the customer to contact a qualified electrician and have the two-prong receptacle replaced with a properly grounded three-prong wall receptacle in accordance with the National Electrical Code. If you must use an extension cord, use **ONLY** a three-wire extension cord having the same or higher electrical rating as the device being connected. In addition, Invacare has placed **RED/ORANGE WARNING TAGS** on some equipment. **DO NOT** remove these tags.

**BATTERIES**

The warranty and performance specifications contained in this manual are based on the use of deep cycle gel cell or sealed lead acid batteries. Invacare strongly recommends their use as the power source for this unit.

Carefully read battery/battery charger information prior to installing, servicing or operating your wheelchair.

**RAIN TEST**

**INVACARE** has tested its power wheelchairs in accordance with ISO 7176 “Rain Test”. This design provides the user or his/her attendant time to remove the power wheelchair from a rain storm and retain wheelchair operation.

**DO NOT** leave power wheelchair in a rain storm of any kind.

**DO NOT** use power wheelchair in a shower.

**DO NOT** leave power wheelchair in a damp area for extended period of time.

Direct exposure to rain or dampness will cause the chair to malfunction electrically and mechanically and may cause the chair to rust prematurely.

Check to ensure that the battery covers are secured in place, joystick boot is **NOT** torn or cracked where water can enter and that all electrical connections are secure at all times.

**DO NOT** use the joystick if the boot is torn or cracked. If the joystick boot becomes torn or cracked, replace **IMMEDIATELY**.

**WEIGHT LIMITATION**

The weight limitation for the Xterra GT wheelchair is 250 lbs.

**WEIGHT TRAINING**

Invacare **DOES NOT** recommend the use of its wheelchairs as a weight training apparatus. Invacare wheelchairs have **NOT** been designed or tested as a seat for any kind of weight training. If occupant uses said wheelchair as a weight training apparatus, **INVACARE SHALL NOT BE LIABLE FOR BODILY INJURY AND THE WARRANTY IS VOID.**



***This Procedure Includes the Following:*****Field Load Test****Using Hydrometer To Check Battery Cells (Lead Acid)****Motor Testing****Motor Brush Inspection****Electro-Mechanical Parking Brake Testing****FIELD LOAD TEST (FIGURE 1)**

*NOTE: The following test can also be performed through the controller of the wheelchair along with a remote programmer. Refer to the individual **CONTROLLER MANUAL** supplied with each wheelchair.*

Old batteries lose their ability to store and release power, due to increased internal resistance. This means that as you try to take power from the battery, some of that power is used up in the process of passing through the battery, resulting in less voltage at the posts. The more power drawn, the lower the voltage available. When this lost voltage drops the output 1.0 volts under load (2.0 for a pair), replace the batteries.

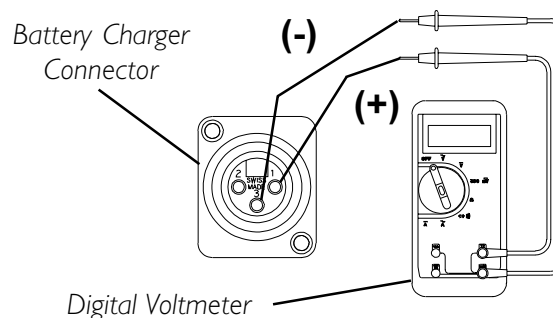
Testing under load is the only way to spot this problem. While special battery load testing equipment is available, it is costly and difficult to transport.

Use a digital voltmeter to check battery charge level at the charger connector. It is located on the base of the wheelchair frame.

*NOTE: **READ** the instructions **CAREFULLY** before using the digital voltmeter.*

*NOTE: Invacare recommends that **ONLY** a qualified service technician perform this test.*

1. Ensure that power is OFF.
2. Make sure battery is fully charged. An extremely discharged battery will exhibit the same symptoms as a bad one.
3. Remove the footrests from the wheelchair and place the CASTERS of the wheelchair against a wall, workbench or other stationary object.
4. Place the voltmeter leads into the charger plug on the wheelchair. Most digital voltmeters are not affected by polarity, however, analog meters (meters with swinging needles) can be and should be used carefully. A good meter reading should be 25.5 to 26 VDC.
5. Have two (2) individuals (one [1] on each arm) apply as much downward pressure as possible on the arms of the wheelchair.
6. Turn the wheelchair ON and push the joystick forward, trying to drive the wheelchair through the stationary object. This puts a heavy load on the batteries as they try to push through the stationary object. Read the meter while the motors are straining to determine the voltage under load.

**FIGURE 1 - FIELD LOAD TEST**

*NOTE: If the voltage drops to less than 23.5 volts from a pair of fully charged batteries while under load, they should be replaced regardless of the unloaded voltages.*

## USING HYDROMETER TO CHECK BATTERY CELLS (LEAD ACID) (FIGURE 2)

NOTE: Perform this procedure when a digital voltmeter is not available.

NOTE:: Use of Lead Acid (wet) batteries is not recommended.

### WARNING

**NEVER** smoke or strike a match near the batteries. If the caps of the battery cells are removed, **NEVER** look directly into them when charging the battery.

The use of rubber gloves and chemical goggles or face shields is recommended when working with batteries.

When reading a hydrometer, **DO NOT** allow any liquid to come in contact with your eyes or skin. It is a form of acid and can cause serious burns, and in some cases, blindness. If you do get battery acid on you, flush the exposed areas with cool water **IMMEDIATELY**. If the acid comes into contact with eyes or causes serious burns, get medical help **IMMEDIATELY**.

The battery acid can damage your wheelchair, clothing, and household items. Therefore, take readings cautiously and only in designated areas.

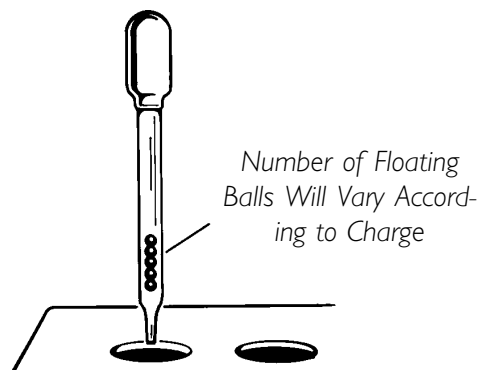
**ONLY** use distilled water when topping off the battery cells.

Most batteries are not sold with instructions. However, warnings are frequently noted on the cell caps. Read them carefully.

1. Remove the battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
2. Remove the battery caps from the battery.
3. Squeeze the air from the hydrometer.
4. Place the hydrometer into a battery cell.

NOTE: **DO NOT** fill hydrometer more than 3/4 full.

5. Draw up sufficient acid to cover float balls.
6. Tap lightly to remove air bubbles.
7. Number of floating balls indicates charge.



### NUMBER OF FLOATING BALLS

0	Discharged
1	25% Charged
2	50% Charged
3	75% Charged
4	100% Charged
* 5	Overcharged

**FIGURE 2 - USING HYDROMETER TO CHECK BATTERY CELLS (LEAD ACID)**

\* Check charging system.

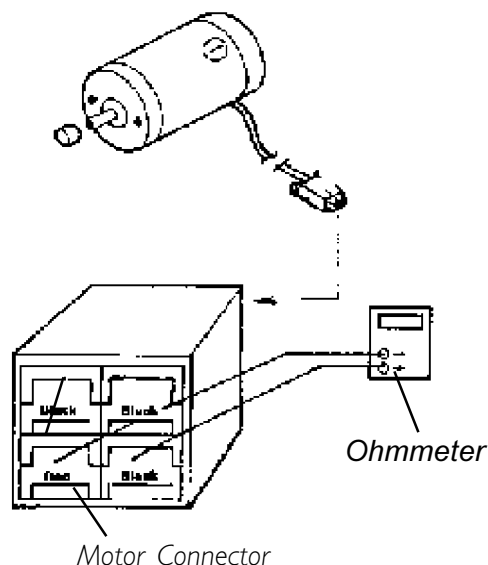
8. Flush the liquid back into the same cell after reading the float. Repeat this step until all cells have been properly read. A shorted or dead cell can be detected when it is the only cell that does not charge.
9. Flush hydrometer in cold running water by allowing the water to rise into hydrometer as far as possible. Do this several times to guard against burn damage.
10. Replace the battery caps.

11. Reinstall battery boxes. Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of

## MOTOR TESTING (FIGURE 3)

1. On the 4-pin motor connector, locate the two (2) contacts in the red and black housings.
2. Set the digital multimeter to measure ohms ( $\Omega$ ).
3. Measure the resistance between the two (2) motor contacts.

*NOTE: A normal reading is between 1 and 5 ohms ( $\Omega$ ). A reading of 0 ohms ( $\Omega$ ) or in excess of 15 ohms ( $\Omega$ ) indicates a problem. High readings are generally caused by bad connections and/or damaged brushes. Contact authorized dealer or Invacare.*



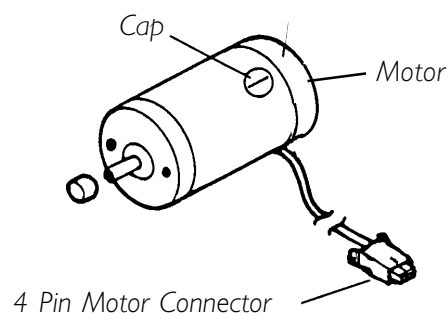
**FIGURE 3 - MOTOR TESTING**

## MOTOR BRUSH INSPECTION (FIGURE 4)

There are two (2) contact brushes on the motors located under the brush caps on the motor housing. If these caps are hard to remove they are either overtightened or the motor has become very hot. Let motors cool. If caps still cannot be removed, it is recommended that the motor be sent to Invacare Technical Services at 1-800-832-4707 for inspection/repair.

*NOTE: It is very important to note which way the brush comes out of the motor. The brush **MUST** be placed into the motor exactly the same way to ensure good contact with the commutator.*

1. Once the motor brush caps have been removed, pull the brushes out of the motor. The end of the brushes should be smooth and shiny and the spring should not be damaged or discolored. If one or both of the brushes are damaged, only the damaged or worn brushes need be replaced. It is very important that any time a brush is replaced, it must be "burned in". This is accomplished by running the motor for one hour in each direction with a half hour break in-between. This should also be done with little or no load on the motor, i.e., put the wheelchair up on blocks so the drive (large) wheels do not contact the ground and run the wheelchair. A motor with only one brush replaced will only carry a small percentage of its rated load capacity until the NEW brush is burned in.

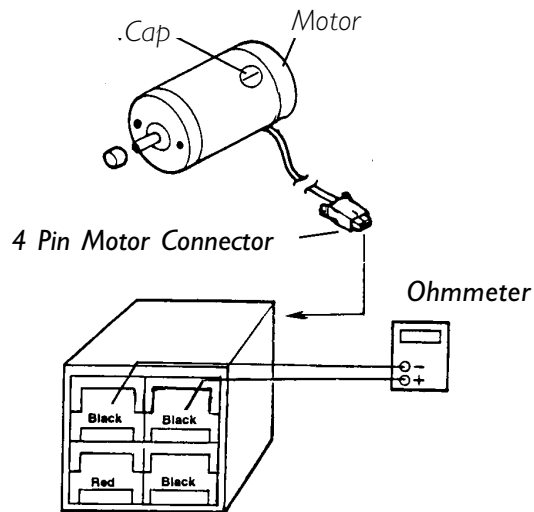


**FIGURE 4 - MOTOR BRUSH INSPECTION**

## ELECTROMECHANICAL PARKING BRAKE TESTING (FIGURE 5)

*NOTE: This procedure should only be performed on wheelchairs with conventional motor/gearbox assembly.*

1. On the four-pin motor connector, locate the side by side connectors in the black housings.
2. Set the digital multimeter to read ohms ( $\Omega$ ).
3. Measure the resistance between the two (2) brake contacts. A normal reading is 100 ohms ( $\Omega$ ). A reading of 0 ohms ( $\Omega$ ) or a very high reading; i.e., MEG ohms or O.L. (out of limit) indicates a shorted brake or an open connection respectively. If either condition exists, send the motor to Invacare Technical Service for inspection/repair.

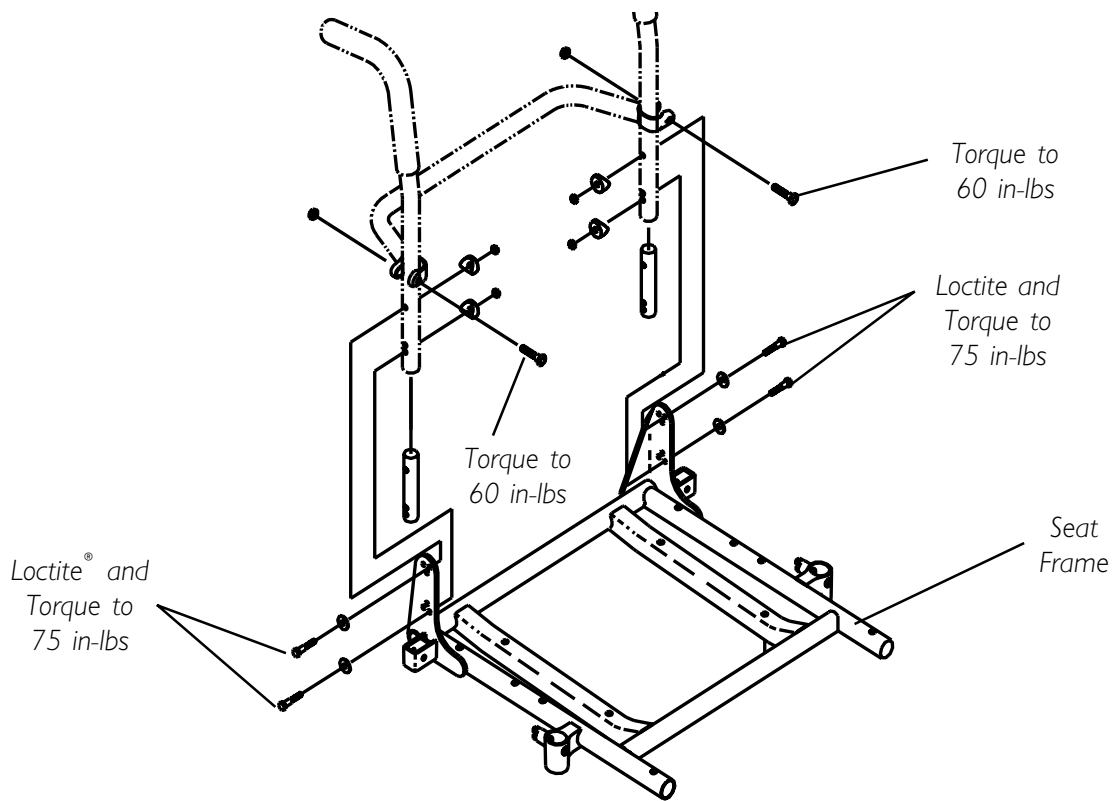


**FIGURE 5 -  
ELECTROMECHANICAL PARKING  
BRAKE TESTING**

*NOTE: A bad motor can damage the controller module but a bad controller will NOT damage a motor.*

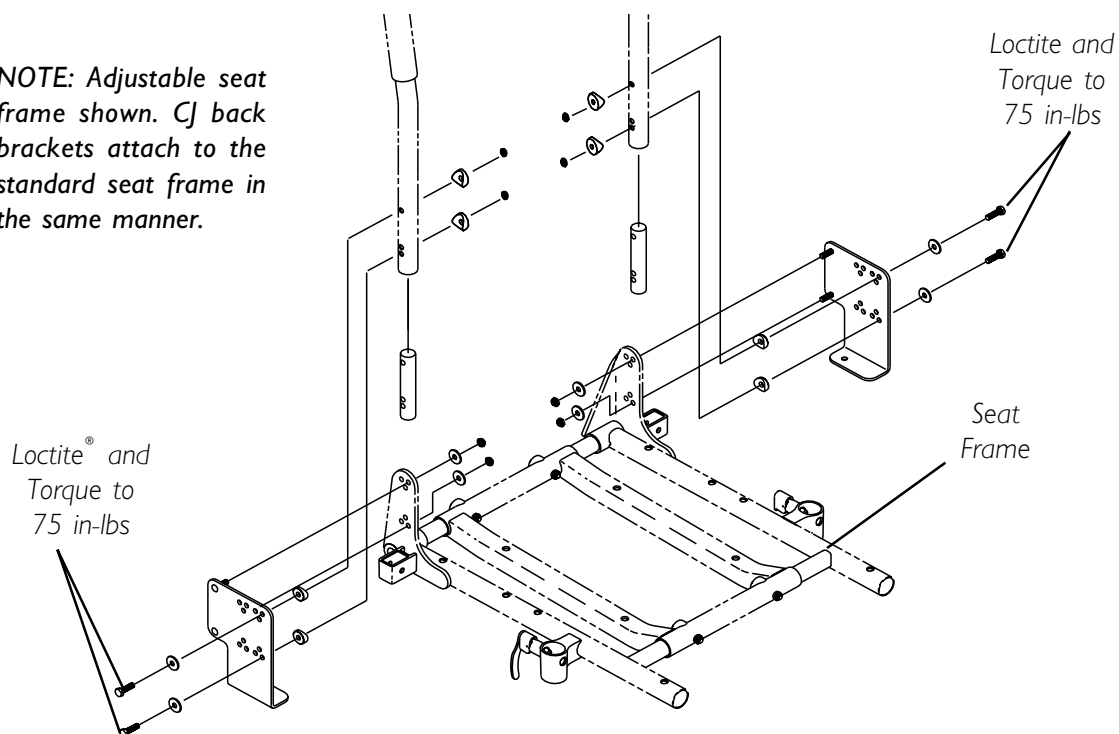
# HARDWARE TORQUE SPECIFICATIONS

## STANDARD SEAT FRAME



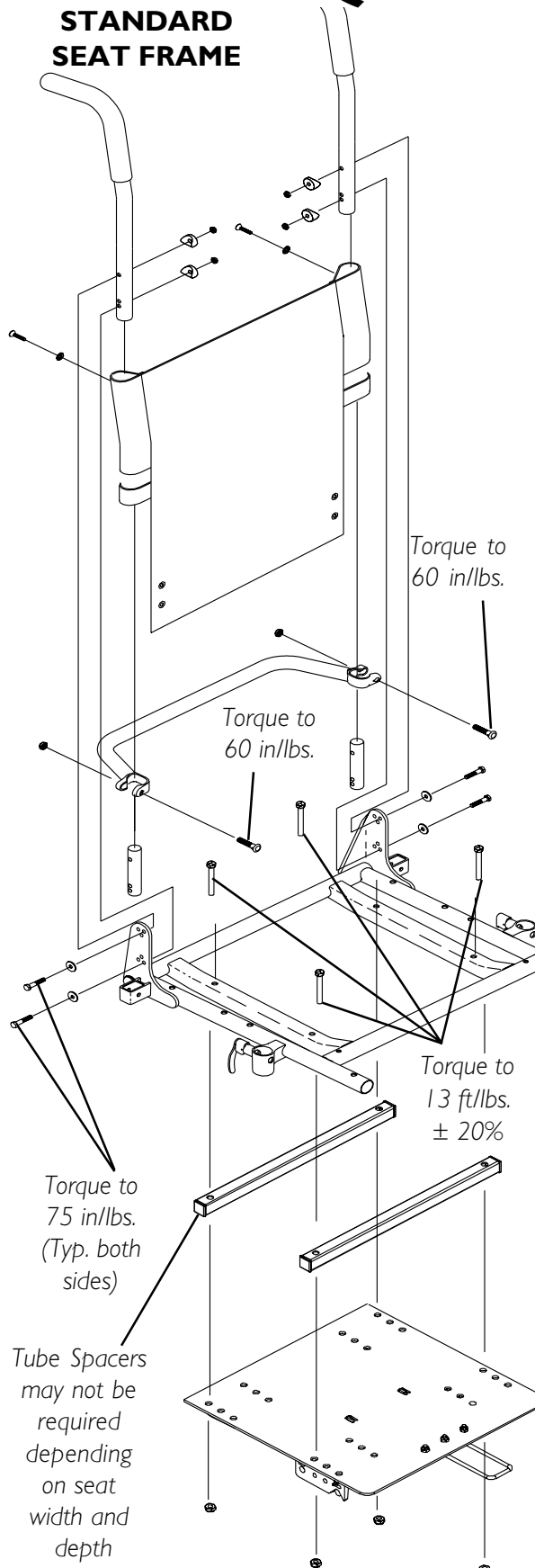
## SEAT FRAME WITH CJ BACK BRACKETS TO OBTAIN 14 AND 15-INCH SEAT DEPTHS

NOTE: Adjustable seat frame shown. CJ back brackets attach to the standard seat frame in the same manner.

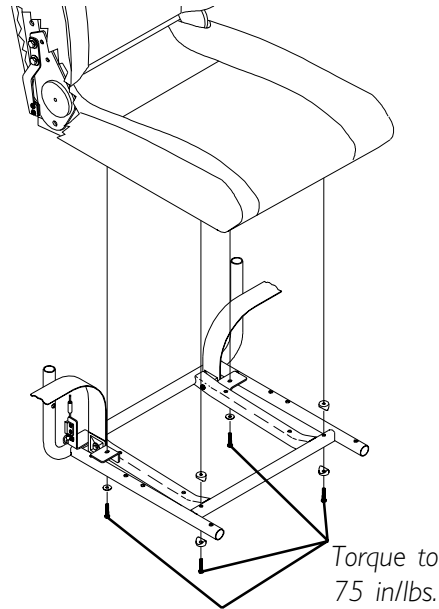
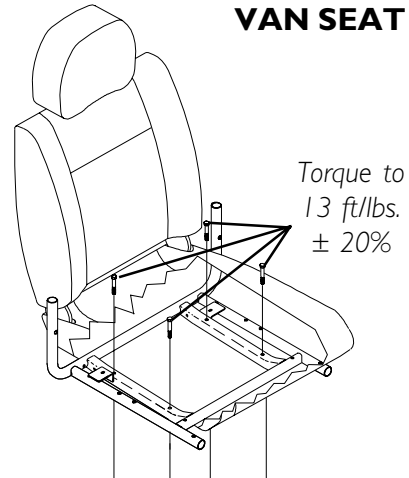


# TORQUE SPECIFICATIONS

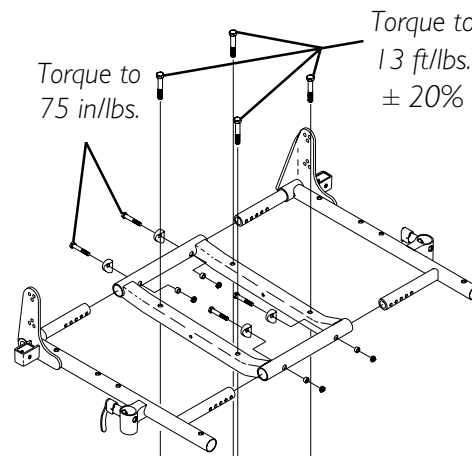
## STANDARD SEAT FRAME



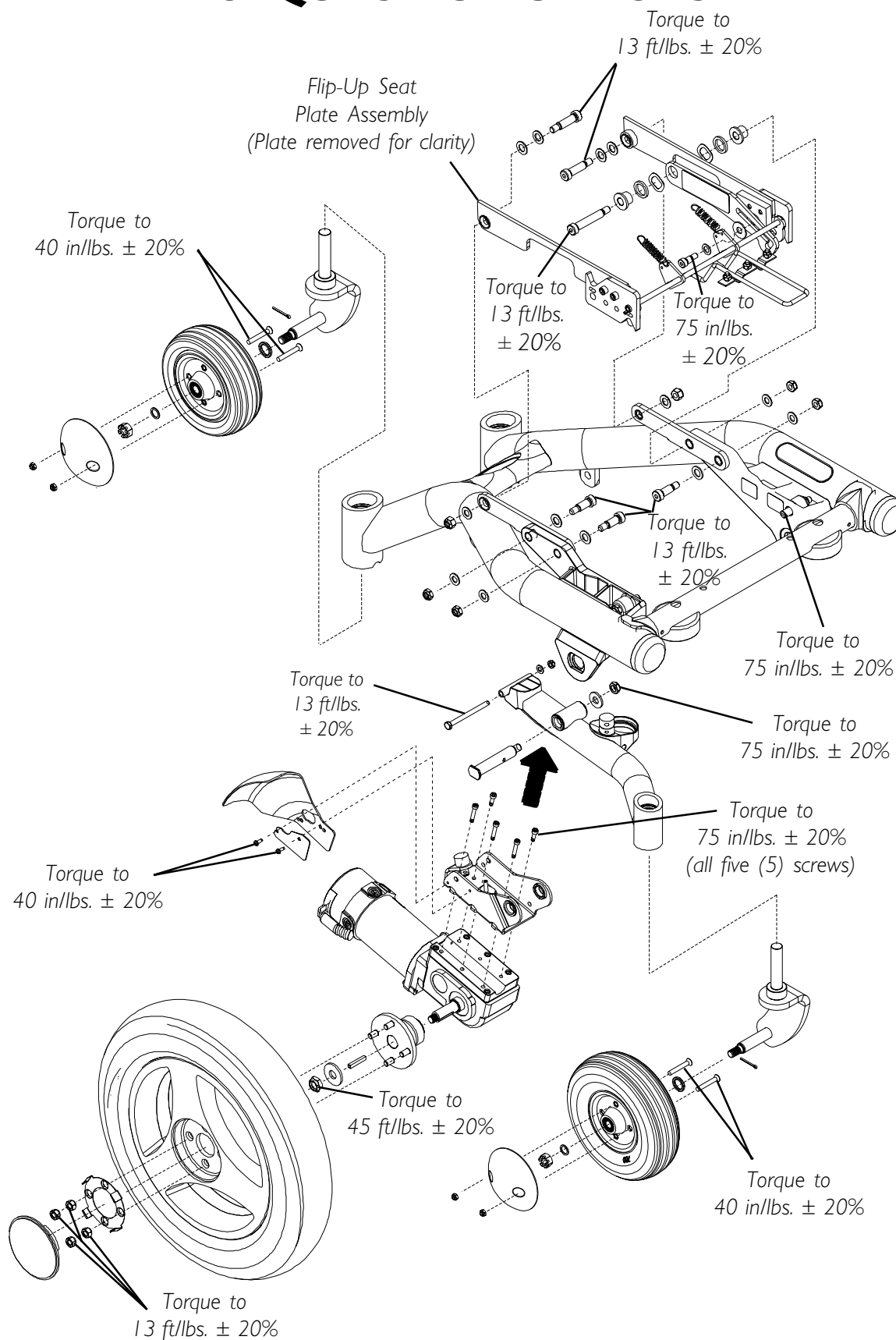
## VAN SEAT



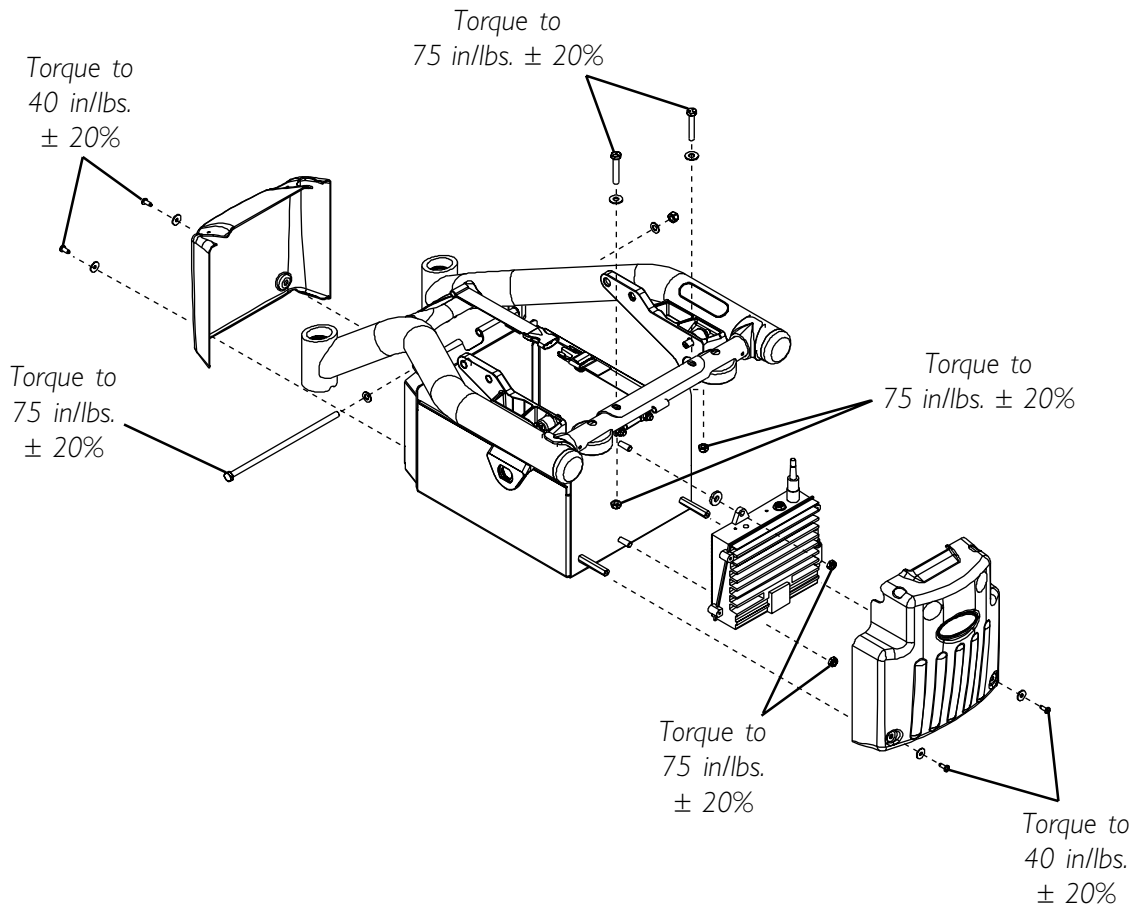
## ADJUSTABLE SEAT FRAME



## BASE FRAME HARDWARE TORQUE SPECIFICATIONS



## BASE FRAME HARDWARE TORQUE SPECIFICATIONS





***This Section Includes the Following:***

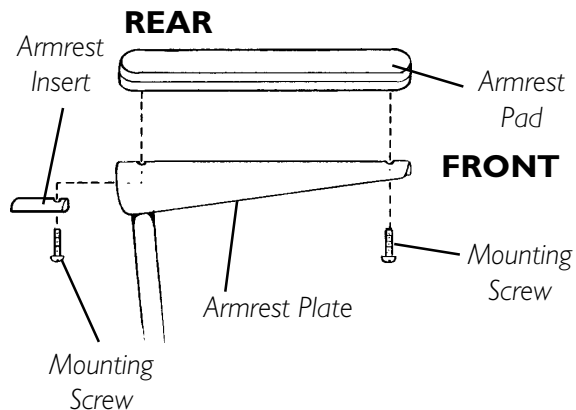
***Replacing Armrest Pads - Van Style Seat***  
***Replacing Van Style Seat Armrest Plate***  
***Installing/Removing Flip Back Armrests***  
***Installing/Removing Van Style Seat Armrests***

**WARNING**

After **ANY** adjustments, repair or service and **BEFORE** use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

## **REPLACING ARMREST PADS - VAN STYLE SEAT (FIGURE 1)**

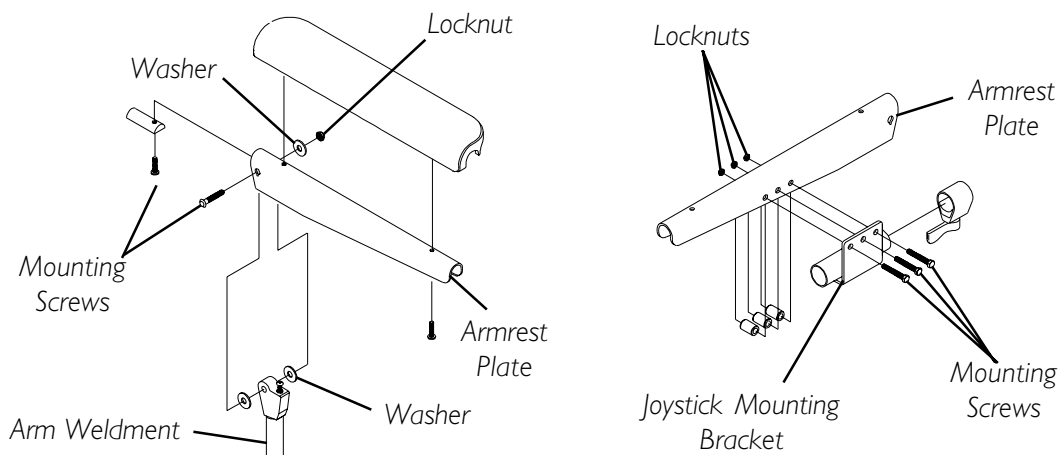
1. Remove the mounting screw that secures the front of the armrest pad to the armrest plate.
2. Remove the mounting screw that secures the rear of the armrest pad and armrest insert to the armrest plate.
3. Remove the EXISTING armrest pad and position the NEW armrest pad on the armrest plate.
4. Line up the mounting holes in the armrest insert, armrest plate and NEW armrest pad.
5. Reinstall the rear mounting screw through the armrest insert, armrest plate and armrest pad and tighten securely.
6. Reinstall the front mounting screw into the armrest plate and NEW armrest pad and tighten securely.



**FIGURE 1 - REPLACING ARMREST PADS - VAN STYLE SEAT**

## **REPLACING ARMREST PLATE VAN STYLE SEAT (FIGURE 2)**

1. If necessary, remove the three (3) mounting screws, spacers and locknuts that secure the joystick mounting bracket to the armrest plate.
2. Remove armrest pad. Refer to REPLACING ARMREST PADS - VAN STYLE SEAT in this section of the manual.
3. Remove the mounting screw, washers and locknut that secure the EXISTING armrest plate to the arm weldment.
4. Position the NEW armrest plate on the armrest weldment and secure with the mounting screw, washers, and locknut. Refer to FIGURE 2 for correct hardware orientation.
5. Reinstall van style armrest pad. Refer to REPLACING ARMREST PADS - VAN STYLE SEAT in this section of the manual.
6. If necessary, reinstall the three (3) mounting screws, spacers and locknuts that secure the joystick mounting bracket to the armrest plate.
7. Repeat STEPS 1-6 for the opposite armrest plate, if necessary.



**FIGURE 2 - REPLACING ARMREST PLATE - VAN STYLE SEAT**

## INSTALLING/REMOVING FLIP BACK ARMRESTS (FIGURE 3)

### WARNING

**Make sure the flip back armrest release and height adjustment levers are in the locked position before using the wheelchair.**

**NOTE:** Flip back armrest release lever must be in the unlocked (UP- HORIZONTAL) position when placing the armrest into the arm sockets.

### REMOVING

*Note: The MKIV-A joystick is one continuous cable that runs from the joystick to the controller. The MKIV-RII joystick can be disconnected at the point directly underneath the armrest.*

1. Unlock the flip back armrest by positioning the flip back armrest release lever into the HORIZONTAL position.
2. Remove the quick release pin that secures the flip back armrest to the rear arm socket.
3. Perform one (1) of the following:

- A. **ARMREST WITH JOYSTICK** - Cut the tie-wraps that secure the joystick cable to the seat frame.

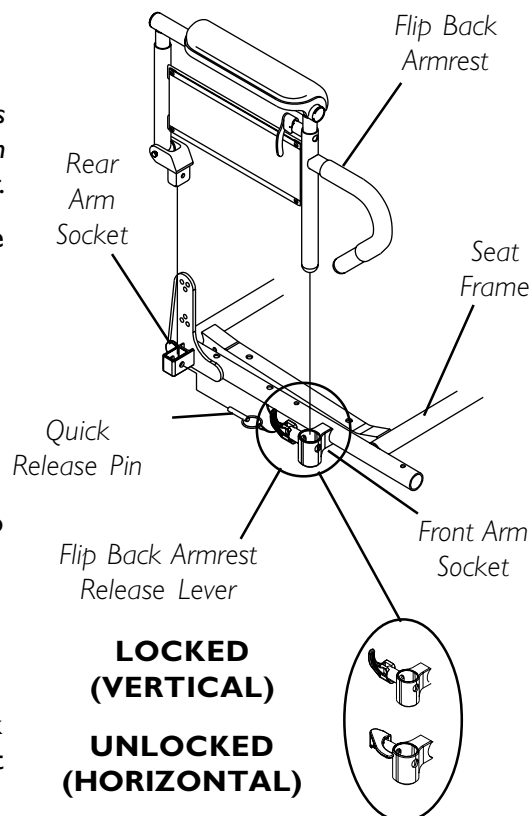
**MKIV-A joystick** - Pull up on the flip back armrest and remove the armrest from the arm sockets and lay on floor.

**MKIV-RII joystick** - Disconnect joystick lead from controller lead at junction point on joystick tube. Pull up on the flip back armrest and remove the armrest from the arm sockets.

- B. **ARMREST W/O JOYSTICK** -

Pull up on the flip back armrest and remove the armrest from the arm sockets

4. Remove the remaining flip-back armrest from the wheelchair.



**FIGURE 3 - INSTALLING/REMOVING FLIP BACK ARMRESTS**

## INSTALLING

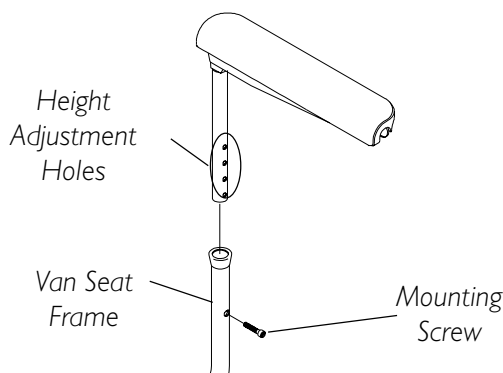
1. Visually inspect to ensure flip back armrest release lever is in the unlocked HORIZONTAL position.
2. Slide the flip back armrest into the arm sockets on the seat frame.
3. Install the quick release pin through the rear arm socket and flip back armrest.
4. Lock the flip back armrest by pressing the flip back armrest release lever into the VERTICAL position.
5. FOR ARMREST WITH JOYSTICK-
  - MKIV-A joystick** - Secure the joystick cable to the seat frame with new tie-wraps.
  - MKIV-RII joystick** - Connect joystick lead and controller lead and secure the joystick cable to the seat frame with new tie-wraps.
6. Repeat STEPS 1-5 for the opposite flip back armrest.

## INSTALLING/REMOVING VAN STYLE SEAT ARMRESTS (FIGURE AND 4)

### REMOVING

*NOTE: The MKIV-A joystick is one continuous cable that runs from the joystick to the controller. The mkiv-RII joystick can be disconnected at the point directly underneath the armrest.*

1. Remove the mounting screw that secures the armrest to the van seat frame.
2. Perform one (1) of the following:
  - A. ARMREST WITH JOYSTICK - Cut the tie-wraps that secure the joystick cable to the seat frame.
    - MKIV-A joystick** - Pull up on the armrest and remove the armrest from the van seat frame and lay on floor.
    - MKIV-RII joystick** - Disconnect joystick lead from controller lead at junction point on joystick tube. Pull up on the armrest and remove the armrest from the van seat frame.
  - B. ARMREST W/O JOYSTICK -
    - Pull up on the armrest and remove the armrest from the van seat frame.



**FIGURE 4 - INSTALLING/REMOVING  
OF ARMREST VAN STYLE SEAT**

### INSTALLING

1. Slide the armrest into the van seat frame.
2. Secure with mounting screw.
3. FOR ARMREST WITH JOYSTICK-
  - MKIV joystick** - Secure the joystick cable to the seat frame with new tie-wraps.
  - RII joystick** - Connect joystick lead and controller lead and secure the joystick cable to the seat frame with new tie-wraps.
4. Repeat STEPS 1-3 for the opposite flip back armrest.

**This Procedure Includes the Following:****Replacing Seat Positioning Strap****Changing Back Height****Removing/Installing Back Upholstery****Back Angle Adjustment****WARNING**

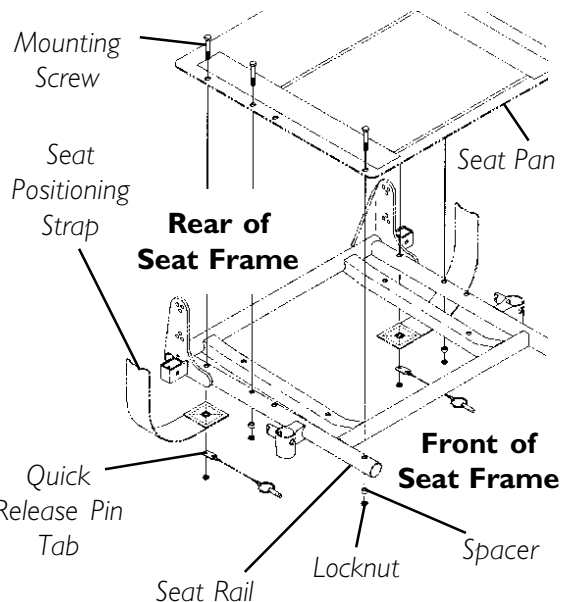
After ANY adjustments, repair or service and BEFORE use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

**STANDARD/ADJUSTABLE SEAT FRAMES (FIGURE 2)**

1. Remove the seat cushion from the seat pan.
2. Move the flip back armrests out of the way. Refer to USING/ADJUSTING FLIP BACK ARMRESTS in PROCEDURE 5 of the Owner's manual, 1106627.
3. Remove the two (2) mounting screws, quick release pin tabs, spacers, and locknuts that secure the seat pan and seat positioning straps to the seat frame.
4. Remove the two (2) halves of the seat positioning strap from the rear seat frame.

**NOTE:** Quick release pin tabs are positioned underneath the seat positioning strap.

5. Reposition the two (2) NEW seat positioning strap halves underneath seat rails.



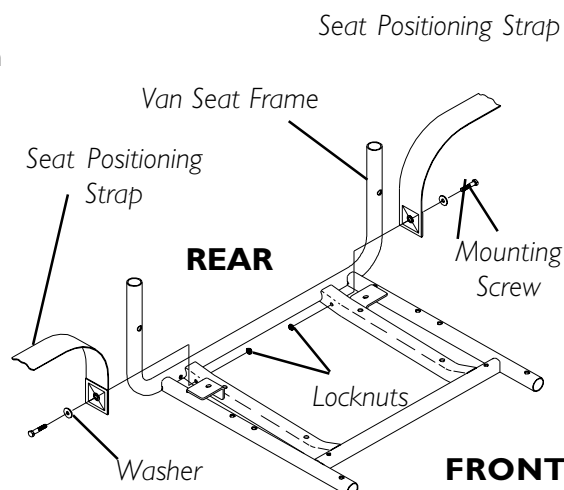
**FIGURE 2 - REPLACING SEAT POSITIONING STRAP**

**REPLACING SEAT POSITIONING STRAP****VAN STYLE SEAT (FIGURE 1)**

1. Remove the van style seat from the van seat frame. Refer to INSTALLING/REMOVING VAN STYLE SEAT ASSEMBLY in SECTION 6 of this manual.
2. Remove the two (2) mounting screws, washers, and locknuts that secure the seat positioning straps to the van seat frame.

**NOTE:** The washer is positioned between the seat positioning strap and the mounting screw.

3. Secure the NEW seat positioning strap halves with the mounting screws, washers and locknuts to the van seat frame and torque to 75-inch pounds.
4. Reinstall the van style seat to the van seat frame. Refer to INSTALLING/REMOVING VAN STYLE SEAT ASSEMBLY in SECTION 6 of this manual.



**FIGURE 1 - REPLACING SEAT POSITIONING STRAP - VAN STYLE SEAT**

6. Reinstall the two (2) mounting screws, quick release pin tabs, spacers, and locknuts that secure the seat pan and seat positioning straps to the seat frame and torque to 75-inch pounds.
7. Reinstall the seat cushion onto the seat pan.

## REMOVING/INSTALLING BACK UPHOLSTERY (FIGURE 3)

### REMOVING

1. Remove one (1) armrest from the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.
2. If applicable, remove the two (2) mounting screws and locknuts that secure the spreader bar to the back canes.
3. Remove the two (2) mounting screws and washers that secure the existing back upholstery to the back canes.
4. Cut the tie-wraps that secure the bottom of the existing back upholstery to the back canes.

*NOTE: Note the back angle before disassembly for proper reinstallation.*

5. On the side of the wheelchair that the armrest was removed, remove one (1) of the mounting screws, washer, spacer, and locknut that secures the back cane to the seat frame or CJ back brackets. *NOTE: CJ back brackets are used to obtain depths of 14 and 15-inch seat depths*

*NOTE: To avoid losing the insert in each back cane, thread the mounting screw just removed through the cane from the inside of the wheelchair to hold the insert in place.*

6. Remove the other mounting screw, washer, spacer, and locknut that secures the back cane to the seat frame.
7. Slide the back cane out of the spreader bar (if applicable) and the existing back upholstery.
8. Remove other armrest from the chair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in PROCEDURE 4 of this manual.
9. Repeat STEPS 5-7 for the opposite side of the wheelchair.
10. Slide the other back cane out of the spreader bar (if applicable) and the existing back upholstery.

### INSTALLING

1. Slide one (1) back cane into NEW back upholstery and through spreader bar (if applicable).
2. Secure back cane to the seat frame or CJ back brackets from the outside of the wheelchair with the existing two (2) mounting screws, washers, spacers, and locknuts. Use Loctite 242 and torque to 75-in/lbs.
3. Repeat STEPS 1-2 for opposite back cane.
4. Secure the top of the NEW back upholstery to the back canes with the two (2) existing mounting screws.

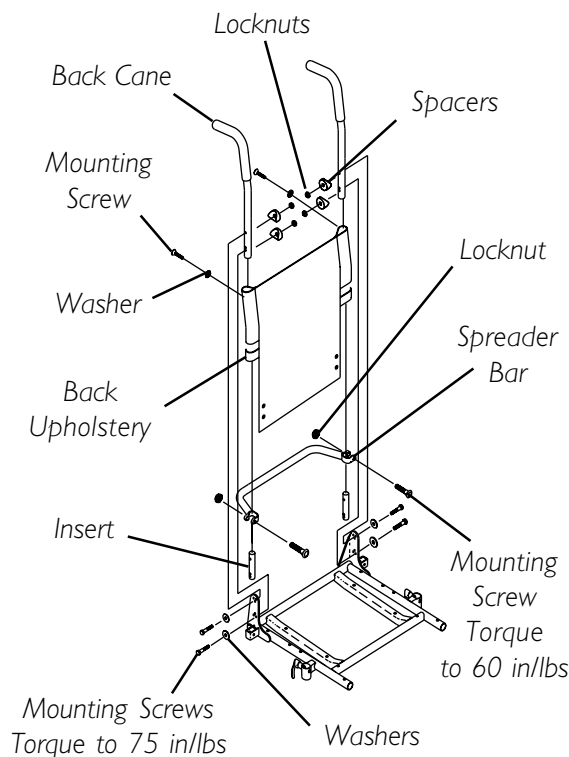
NOTE: When replacing the back upholstery, back assembly or changing back height, follow these guidelines for spreader bar height:

STANDARD MODELS	
BACK HEIGHT	◆ SPREADER BAR HEIGHT
16-inches*	5-inches
17-inches*	5-inches
18-19-inches*	7-inches
20-22-inches	7-inches

NOTE: Spreader Bar required on ALL back heights between 20-24-inches. \*Spreader bar required on back heights 16,17,18, or 19 ONLY if the width or depth of the chair exceeds 19-inches.

◆Height of Spreader Bar from Bottom of Back Canes to Top of Spreader Bar Clamp.

- If applicable, reposition the spreader bar at the correct height for the corresponding back height and torque the mounting hardware to 60-in/lbs.
- Reinstall the armrest onto the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.



**FIGURE 3 - REPLACING BACK UPHOLSTERY**

## CHANGING BACK HEIGHT (FIGURE 4)

*NOTE: If changing the back height, new back upholstery may be needed as well. Refer to the following chart to determine if new back upholstery is needed:*

### BACK UPHOLSTERY HEIGHT

16-17-INCHES

18-19-INCHES

20-INCHES

21-22-INCHES

If back height required is within the range of the original back height, only new back canes will be needed.

If the back height required is **NOT** within the range of the original back height, new back upholstery, as well as new back canes will be required.

*NOTE: Existing hardware and inserts will be reused.*

1. Remove the flip back armrests from the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.

*NOTE: Note the correct mounting screw mounting positions to ensure the proper back angle for reinstallation.*

2. Remove the two (2) mounting screws and washers that secure the existing back upholstery to the back canes.
3. Remove the four (4) mounting screws, washers, spacers, and locknuts that secure the existing back canes to the seat frame.
4. Remove the inserts from the existing back canes.
5. Remove the back assembly from the wheelchair.
6. If applicable, loosen, but do not remove the mounting screws and locknuts that secure the spreader bar to the existing back canes.
7. Remove existing back canes from the back assembly.
8. Slide the inserts into the bottom of the NEW back canes.
9. Line up the mounting holes of the inserts with the mounting holes in the back canes.

*NOTE: To keep the inserts lined up for reinstallation onto the wheelchair, start one (1) of the mounting screws through the back cane from inside of the wheelchair to hold the insert in place.*

10. Slide the NEW back canes through the existing/NEW back upholstery and spreader bar.
11. If applicable, loosely tighten the mounting screws that secure the spreader bar to the NEW back canes.
12. Line up the mounting holes in the back canes with the mounting holes in the seat frame.

*NOTE: Refer to BACK ANGLE ADJUSTMENT in this section of the manual to determine the proper mounting holes for the desired back angle.*

### WARNING

**The back canes MUST be fastened securely to the seat frame BEFORE using the wheelchair. Torque to 75-inch pounds.**

13. Secure the two (2) NEW back canes to the seat frame with the existing four (4) mounting screws, washers, spacers, and locknuts. Use Loctite 242 and torque to 75-in/lbs.

14. Secure the top of the existing/new back upholstery to the back canes with the two (2) existing mounting screws and washers.
15. Secure bottom of the existing/new back upholstery to rear of the seat pan.
16. Secure the bottom of the existing/new back upholstery to the back canes with new tie-wraps.

*NOTE: Clean upholstery with warm DAMP cloth and mild detergent to remove superficial soil.*

### WARNING

**Laundering or moisture will reduce flame retardancy of the upholstery.**

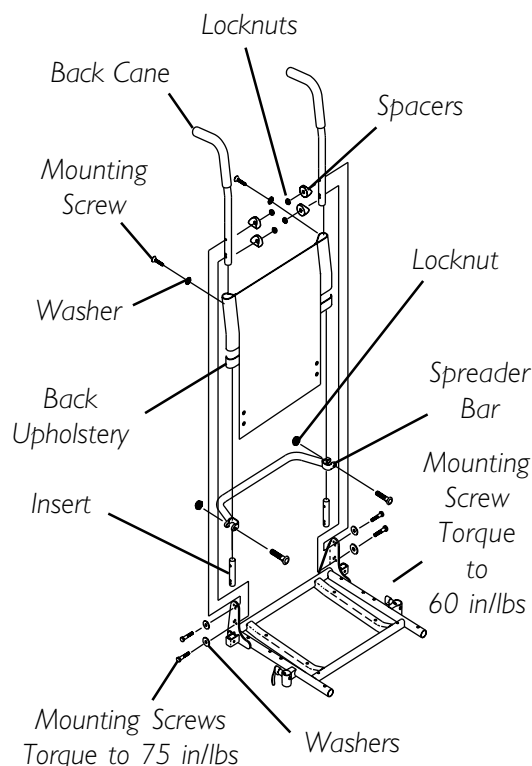
*NOTE: When replacing the back upholstery, back assembly or changing back height, follow these guidelines for spreader bar height (where applicable).*

BACK HEIGHT	◆ SPREADER BAR HEIGHT
16-inches*	5-inches
17-inches*	5-inches
18-19-inches*	7-inches
20-22-inches	7-inches

*NOTE: Spreader Bar required on back heights 20-22-inches. \*Spreader bar ONLY required on these back heights if the width or depth of the chair exceeds 19-inches.*

◆ **Height of Spreader Bar from Bottom of Back Canes to Top of Spreader Bar Clamp.**

17. If necessary, reposition the spreader bar at the correct height for the corresponding back height and torque the mounting hardware to 60-inch pounds.
18. Reinstall the armrest onto the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.



**FIGURE 4 - REMOVING/INSTALLING BACK UPHOLSTERY**

### BACK ANGLE ADJUSTMENT (FIGURE 5)

1. Remove armrests from the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in this manual.
2. Remove the mounting screw and washer from the top mounting hole of back angle plate and back cane.

*NOTE: To avoid losing the insert in each back cane, thread the mounting screw through the cane from the inside of wheelchair to hold the insert in place.*



3. Remove the mounting screw and washer from the bottom mounting hole of the back angle plate and back cane.
4. Reposition the back canes into the correct mounting holes of the back angle plate to obtain a back angle between 80° and 100° in 5° increments.
5. Torque mounting screws to 75-inch pounds.
6. Reinstall the armrests onto the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.

TO ACHIEVE A BACK ANGLE OF:

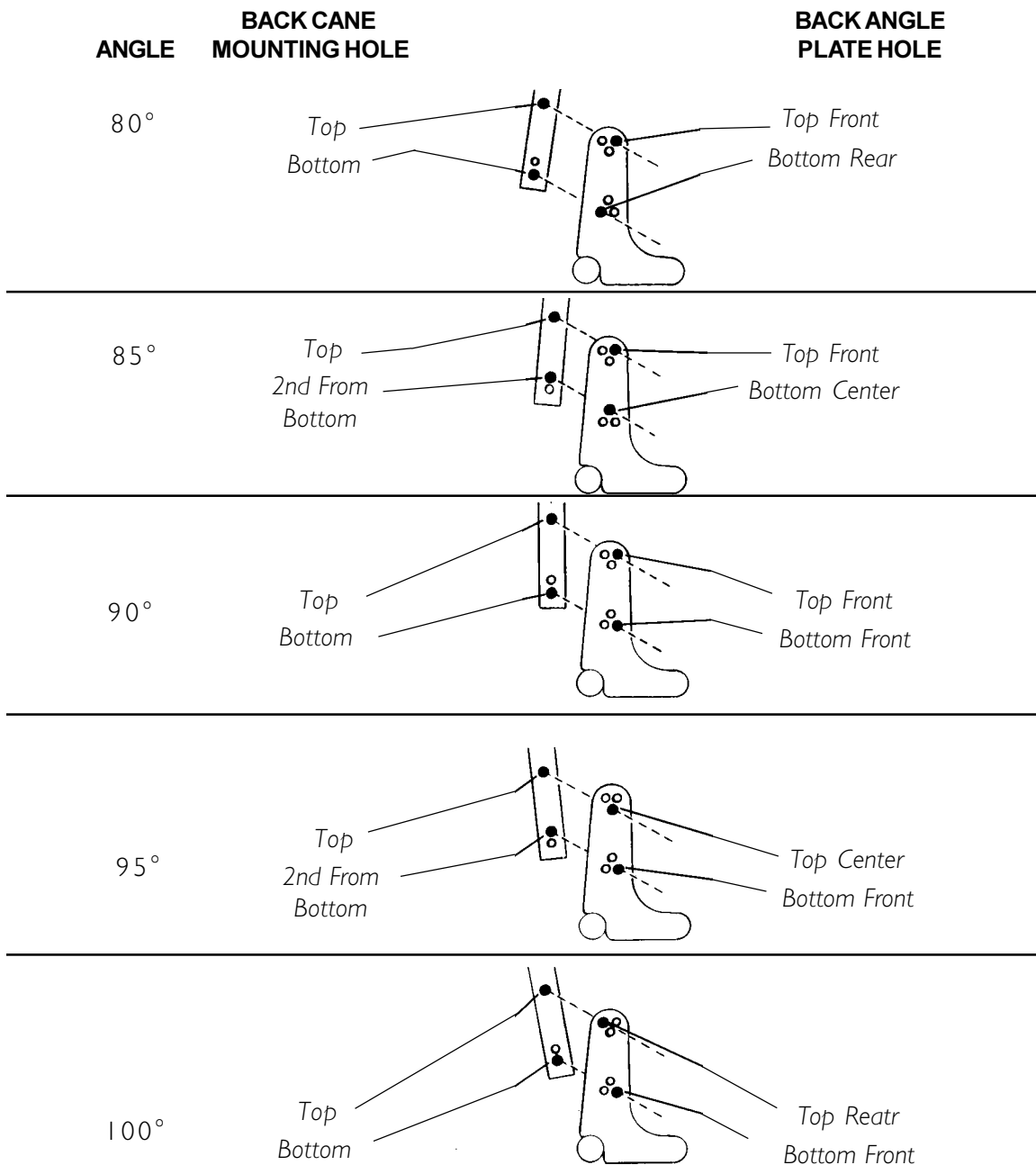


FIGURE 5 - BACK ANGLE ADJUSTMENT

*This Section includes the following:*

*Removing/Installing Seat Frame for 14 and 15-inch Seat Widths*

*Removing/Installing Seat Frame for 16-inch Seat Widths*

*Removing/Installing Seat Frame for 17 and 18-inch Seat Widths*

*Removing/Installing Seat Frame for 19 and 20-inch Seat Widths*

*Installing Seat Frame for 19 and 20-inch Seat Widths*

*Changing Seat Depth*

*Removing/Installing Seat Pan*

*Removing/Installing CJ Back Brackets*

*Changing Seat Width of Fixed Seat Frames (16, 17, 18, 19, and 20-inch wide)*

*Changing Seat Width of Adjustable Seat Frames (14, 15, and 16-inch wide)*

*Component Replacement for 14-inch, 15-inch, and 16-inch Seat Frames*

*Installing/Removing Van Style Seat/Seat Frame Assembly from Flip-up Seat Plate*

*Installing/Removing Van Style Seat from Seat Frame Assembly*

## WARNING

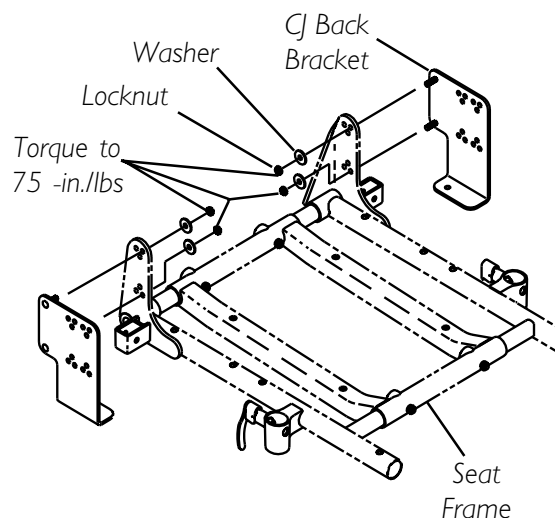
After ANY adjustments, repair or service and BEFORE use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

## REMOVING/INSTALLING SEAT FRAME FOR 14 AND 15-INCH SEAT WIDTHS

NOTE: When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of LOCTITE® 242 and torque specifications or SECTION 3 of this manual.

### REMOVING (FIGURES 1 AND 2)

1. Remove footrest assemblies. Refer to PROCEDURE 4 in the owner's manual, part number 1106627.
2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to REMOVING THE SEAT PAN in this section of the manual.
5. Remove flip back armrest. Refer to REMOVING/INSTALLING THE ARMRESTS in SECTION 4 of this manual.



**FIGURE 1 - REMOVING SEAT FRAME (14/15-INCH SEAT WIDTHS)**

6. Perform one (1) of the following:

**A. FOR 14 AND 15-INCH SEAT DEPTHS:**

1. Remove the back upholstery from the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
2. Remove the two (2) washers and locknuts that secure each CJ bracket to the seat frame.

**B. FOR 16, 17, 18, 19 AND 20-INCH SEAT DEPTHS:**

1. Remove the back upholstery from the seat frame. Refer to REMOVING/INSTALLING THE BACK UPHOLSTERY in SECTION 5 of this manual.

*NOTE: When performing STEP 7 note the mounting location of the mounting screws on the flip-up seat plate for proper reinstallation of the seat frame. FIGURE 2 illustrates various configurations of how the seat frame is attached to the flip-up seat plate.*

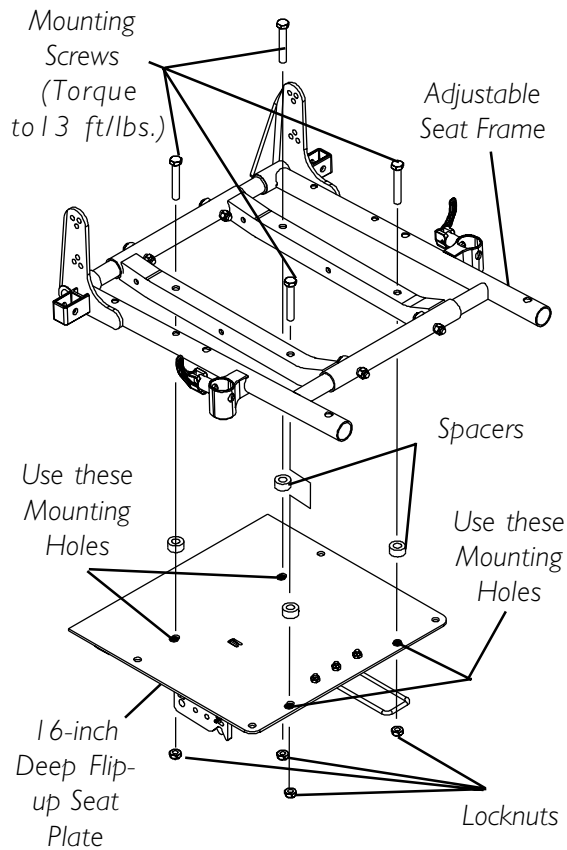
7. Remove the four (4) mounting screws, spacers and locknuts that secure the seat frame to the flip-up seat plate.
8. Remove the existing seat frame.

## INSTALLING (FIGURES 1 AND 2)

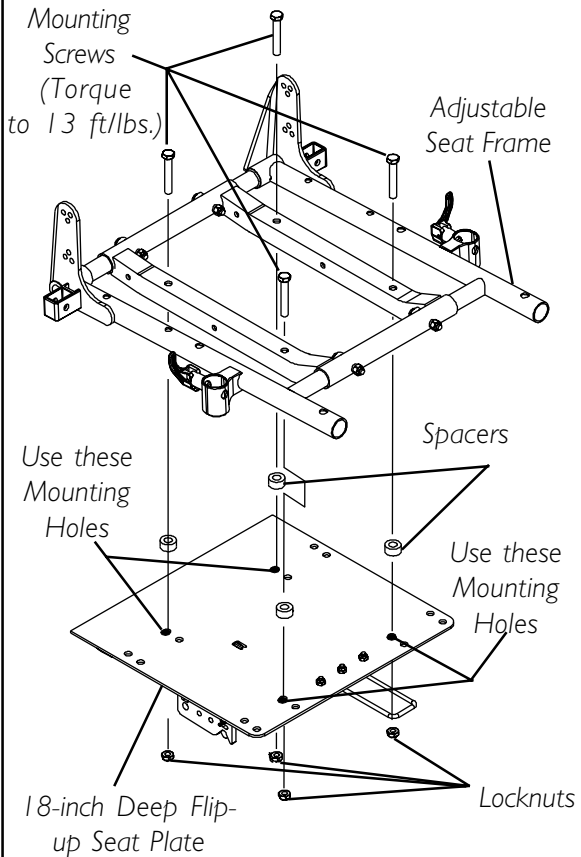
1. Secure the seat frame to the flip-up seat plate, in the mounting location previously noted, with the existing four (4) mounting screws, spacers and locknuts. Torque mounting screws to 13 ft/lbs.  $\pm$  20%. (FIGURE 2)
2. Perform one (1) of the following:
  - A. For 14 and 15-inch seat depths:**
    1. Secure each CJ bracket to the seat frame the two (2) washers and locknuts. Torque locknuts to 75 in./lbs. (FIGURE 1)
    2. Install the back upholstery onto the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
  - B. For 16, 17, 18, 19 and 20-inch seat depths:**
    1. Install the back upholstery onto the seat frame. Refer REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
3. Install the flip back armrest and secure cable in place with tie wraps. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 in this manual.
4. Install the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
5. Install the seat cushion.
6. Install the battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
7. Install footrest assemblies. Refer to SECTION 8 in the Owner's Manual, 1106627.

NOTE: 16-inch deep seat frame and CJ back brackets are used to obtain 14 and 15-inch depths.

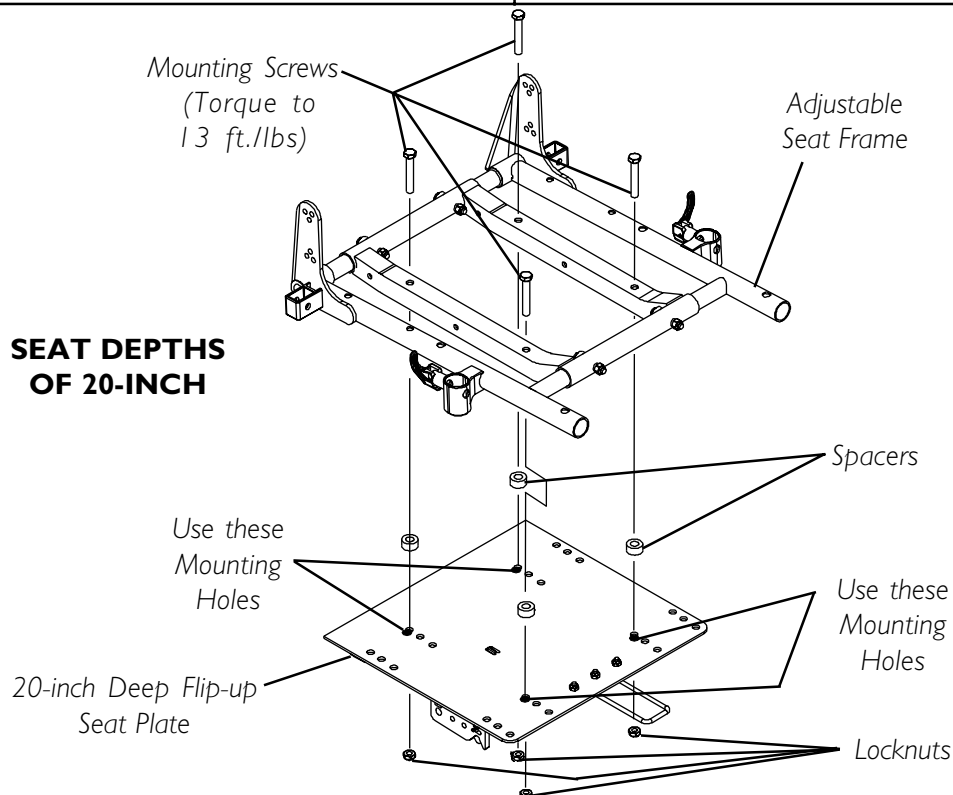
### 14,15,16, AND 17-INCH SEAT DEPTHS



### 18 AND 19-INCH SEAT DEPTHS



### SEAT DEPTHS OF 20-INCH



**FIGURE 2 - REMOVING SEAT FRAME (14/15-INCH SEAT WIDTHS)**

## REMOVING/INSTALLING SEAT FRAME FOR 16-INCH SEAT WIDTHS

**NOTE:** When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of **LOCTITE 242** and torque specifications or **SECTION 3** of this manual.

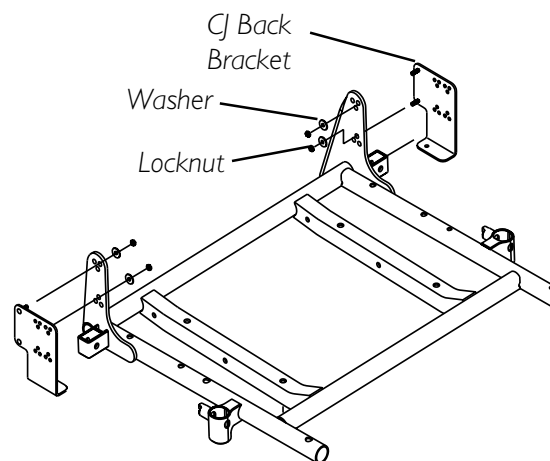
### REMOVING (FIGURES 3 AND 4)

1. Remove footrest assemblies. Refer to **PROCEDURE 4** in the Owner's Manual, part no. 1106627.
2. Remove battery box(es). Refer to **INSTALLING/REMOVING BATTERY BOX** in **SECTION 8** of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to **REMOVING SEAT PAN** in this section of the manual.
5. Remove flip back armrest. Refer to **REMOVING/INSTALLING ARMRESTS** in **SECTION 4** in this manual.
6. Perform one (1) of the following:
  - A. **For 14 and 15-inch seat depths:**
    1. Remove the back upholstery from the CJ back brackets. Refer to **REMOVING/INSTALLING BACK UPHOLSTERY** in **SECTION 5** of this manual.
    2. Remove the two (2) washers and locknuts that secure each CJ bracket to the fixed or adjustable seat frame.
  - B. **For 16, 17, 18, 19 and 20-inch seat depths:**
    1. Remove the back upholstery from the seat frame. Refer to **REMOVING/INSTALLING BACK UPHOLSTERY** in **SECTION 5** of this manual.

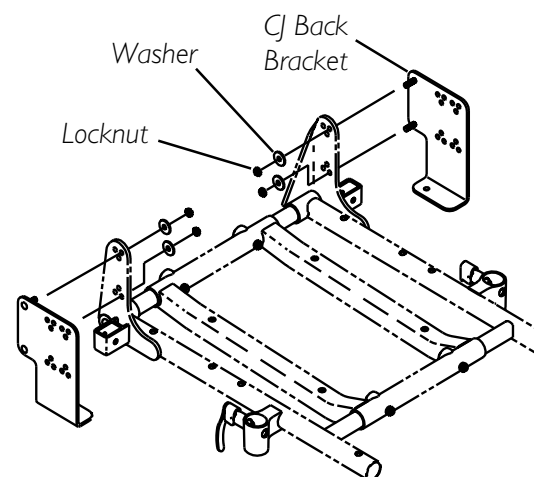
**NOTE:** When performing **STEP 7** note the mounting location of the mounting screws on the flip-up seat plate for proper reinstallation of the seat frame. **FIGURE 4** illustrates various configurations of how the seat frame is attached to the flip-up seat plate.

7. Remove the four (4) mounting screws and tube spacers (if applicable) and locknuts that secure the seat frame to the flip-up seat plate.
8. Remove the existing fixed/adjustable seat frame.

#### FIXED SEAT FRAME

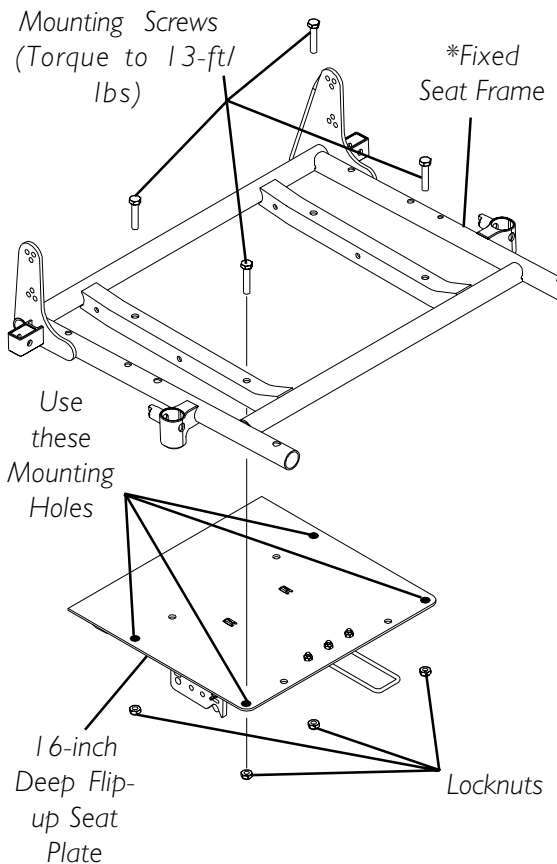
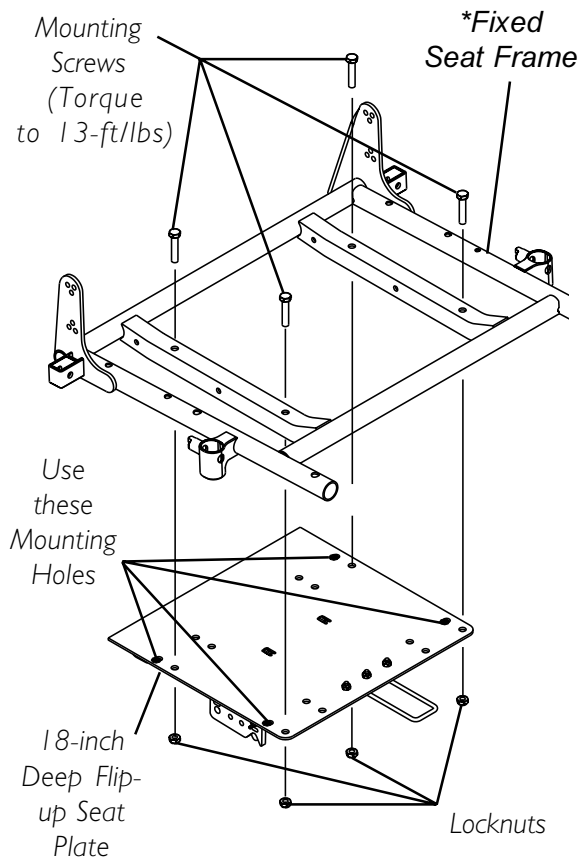
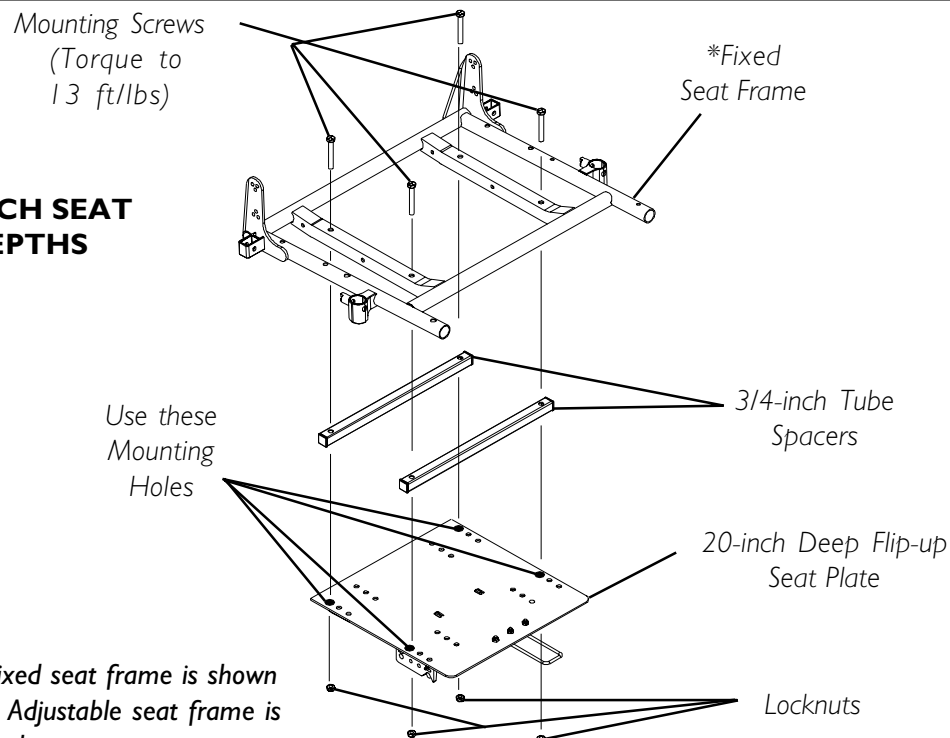


#### ADJUSTABLE SEAT FRAME



**NOTE:** 16-inch seat widths can have either a fixed frame or adjustable seat frame.

**FIGURE 3 - REMOVING SEAT FRAME (16-INCH SEAT WIDTHS)**

**14,15,16, AND 17-INCH SEAT DEPTHS****18 AND 19-INCH SEAT DEPTHS****20-INCH SEAT DEPTHS**

*\*NOTE: Fixed seat frame is shown for clarity. Adjustable seat frame is secured in the same way.*

**FIGURE 4 - REMOVING/INSTALLING SEAT FRAME (16-INCH SEAT WIDTHS)**

**INSTALLING (FIGURES 3 AND 4)**

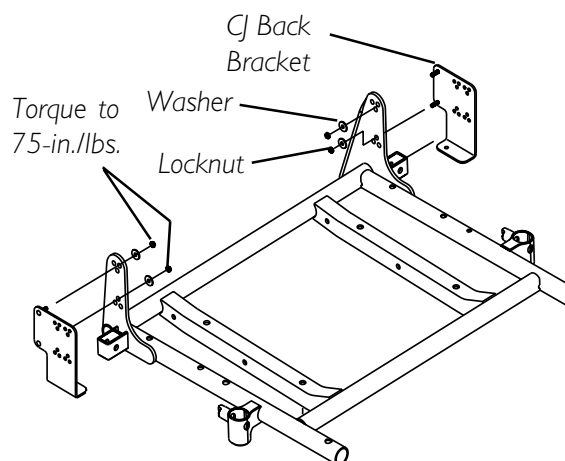
1. Secure the seat frame to the flip-up seat plate, in the mounting location noted in the removal section, with the existing four (4) mounting screws, spacers (if applicable) and locknuts. Torque mounting screws to 13 ft/lbs.  $\pm$  20%. (FIGURE 4)
2. Perform one (1) of the following:
  - A. **FOR 14 AND 15-INCH SEAT DEPTHS:**
    1. Secure each CJ bracket to the seat frame the two (2) washers and locknuts. Torque locknuts to 75 in./lbs. (FIGURE 3)
    2. Install the back upholstery onto the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
  - B. **FOR 16, 17, 18, 19 AND 20-INCH SEAT DEPTHS:**
    1. Install the back upholstery onto the seat frame. Refer REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
4. Install the flip back armrest and secure cable in place with tie wraps. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 of this manual.
5. Install the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
6. Install the seat cushion.
7. Install the battery box(es). Refer to INSTALLING/REMOVING BATTERY BOXES in SECTION 8 of this manual.
8. Install footrest assemblies. Refer to PROCEDURE 4 in the Owner's Manual, part number 1106627.

## REMOVING/INSTALLING SEAT FRAME FOR 17 AND 18-INCH SEAT WIDTHS

**NOTE:** When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of **LOCTITE 242** and torque specifications or **SECTION 3** of this manual.

### REMOVING (FIGURES 5 AND 6)

1. Remove footrest assemblies. Refer to **PROCEDURE 4** in the Owner's Manual, part no. 1106627.
2. Remove battery box(es). Refer to **INSTALLING/REMOVING BATTERY BOX** in **SECTION 8** of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to **REMOVING/INSTALLING SEAT PAN** in this section of the manual.
5. Remove flip back armrest. Refer to **REMOVING/INSTALLING ARMRESTS** in **SECTION 4** in this manual.
6. Perform one (1) of the following:
  - A. **For 14 and 15-inch seat depths:**
    1. Remove the back upholstery from the CJ back brackets. Refer to **REMOVING/INSTALLING BACK UPHOLSTERY** in **SECTION 5** of this manual.
    2. Remove the two (2) washers and locknuts that secure each CJ bracket to the seat frame.
  - B. **For 16, 17, 18, 19 and 20-inch seat depths:**
    1. Remove the back upholstery from the seat frame. Refer to **REMOVING/INSTALLING BACK UPHOLSTERY** in **SECTION 5** of this manual.

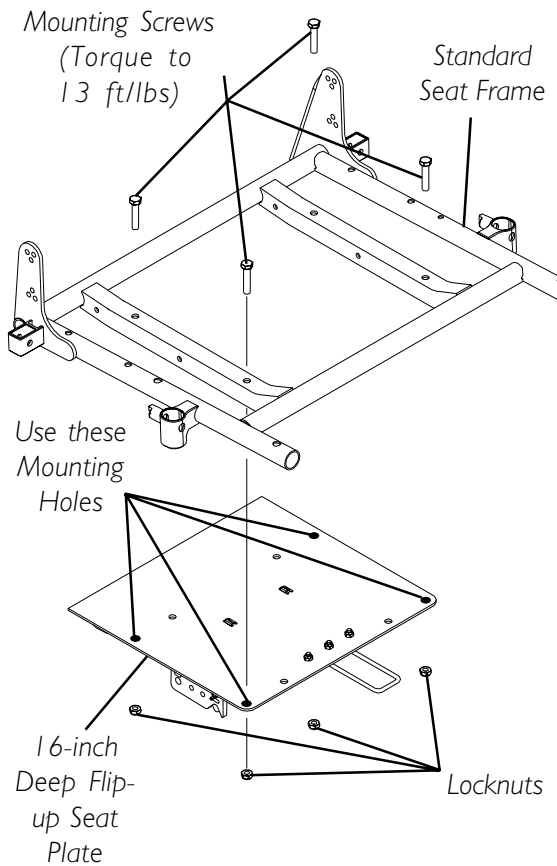
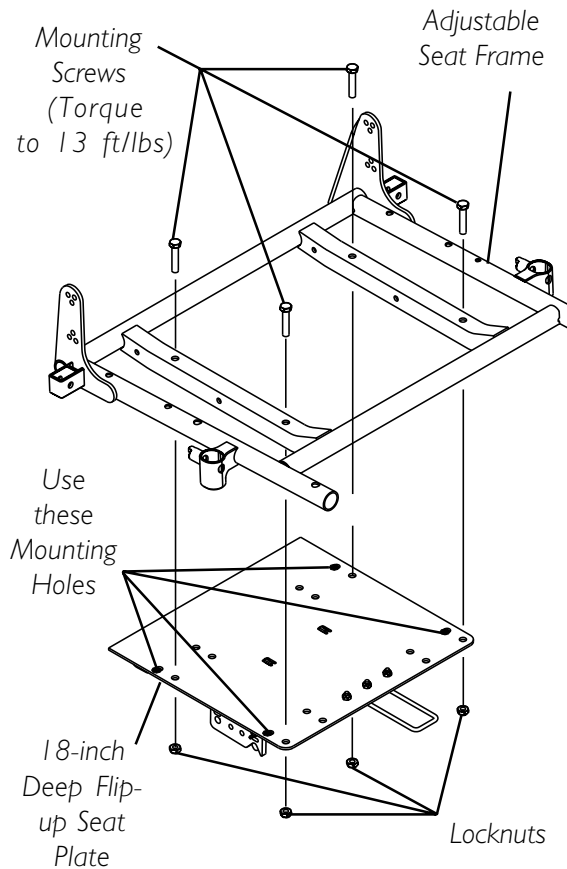
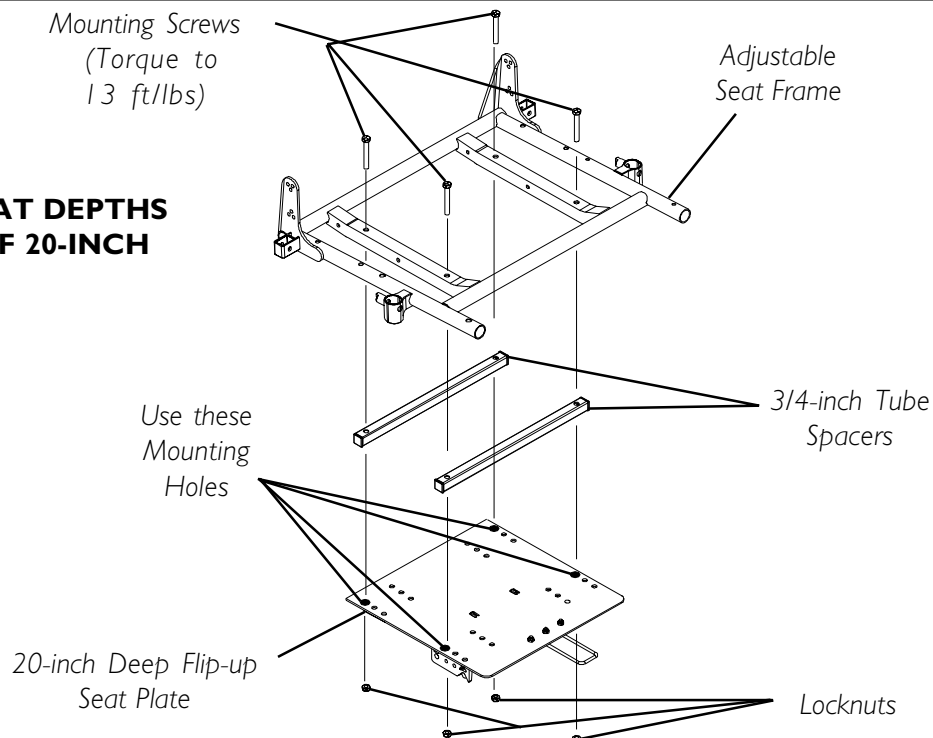


**FIGURE 5 - REMOVING SEAT FRAME (17 AND 18-INCH SEAT WIDTHS)**

**NOTE:** When performing **STEP 7** note the mounting location of the mounting screws on the flip-up seat plate for proper reinstallation of the seat frame. **FIGURE 6** illustrates various configurations of how the seat frame is attached to the flip-up seat plate.

7. Remove the four (4) mounting screws, spacers or tube spacers (if applicable) and locknuts that secure the seat frame to the flip-up seat plate.
8. Remove the existing seat frame.



**14,15,16, AND 17-INCH SEAT DEPTHS****18 AND 19-INCH SEAT DEPTHS****SEAT DEPTHS  
OF 20-INCH****FIGURE 6 - REMOVING SEAT FRAME (17 AND 18-INCH SEAT WIDTHS)**

**INSTALLING (FIGURES 5 AND 6)**

1. Secure the seat frame to the flip-up seat plate, in the mounting location noted in the removal section, with the existing four (4) mounting screws, spacers (if applicable) and locknuts. Torque mounting screws to 13 ft/lbs.  $\pm$  20%. (FIGURE 6)
2. Perform one (1) of the following:
  - A. **FOR 14 AND 15-INCH SEAT DEPTHS:**
    1. Secure each CJ bracket to the seat frame the two (2) washers and locknuts. Torque locknuts to 75 in./lbs. (FIGURE 5)
    2. Install the back upholstery onto the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
  - B. **FOR 16, 17, 18, 19 AND 20-INCH SEAT DEPTHS:**
    1. Install the back upholstery onto the seat frame. Refer REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
4. Install the flip back armrest and secure cable in place with tie wraps. Refer to REMOVING/INSTALLING THE ARMRESTS in SECTION 4 of this manual.
5. Install the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
6. Install the seat cushion.
7. Install the battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
8. Install footrest assemblies. Refer to PROCEDURE 4 in the Owner's Manual, part number 1106627.

## REMOVING/INSTALLING SEAT FRAME FOR 19 AND 20-INCH SEAT WIDTHS

*NOTE: When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of LOCTITE 242 and torque specifications or SECTION 3 of this manual.*

### REMOVING (FIGURES 7 AND 8)

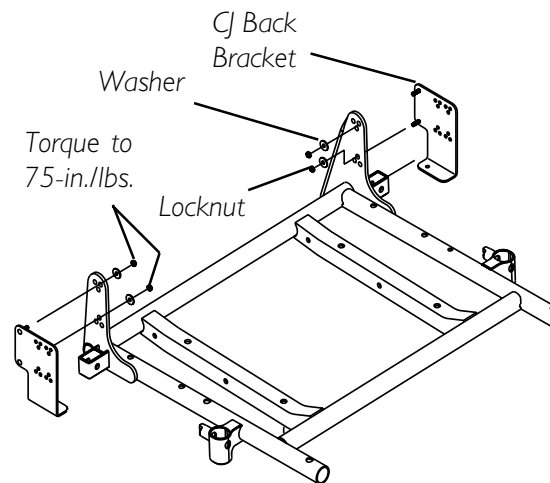
1. Remove footrest assemblies. Refer to PROCEDURE 4 in the Owner's manual, 1106627.
2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
5. Remove flip back armrest. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 of this manual.
6. Perform one (1) of the following:

#### A. For 14 and 15-inch seat depths:

1. Remove the back upholstery from the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
2. Remove the two (2) washers and locknuts that secure each CJ bracket to the seat frame.

#### B. For 16, 17, 18, 19 and 20-inch seat depths:

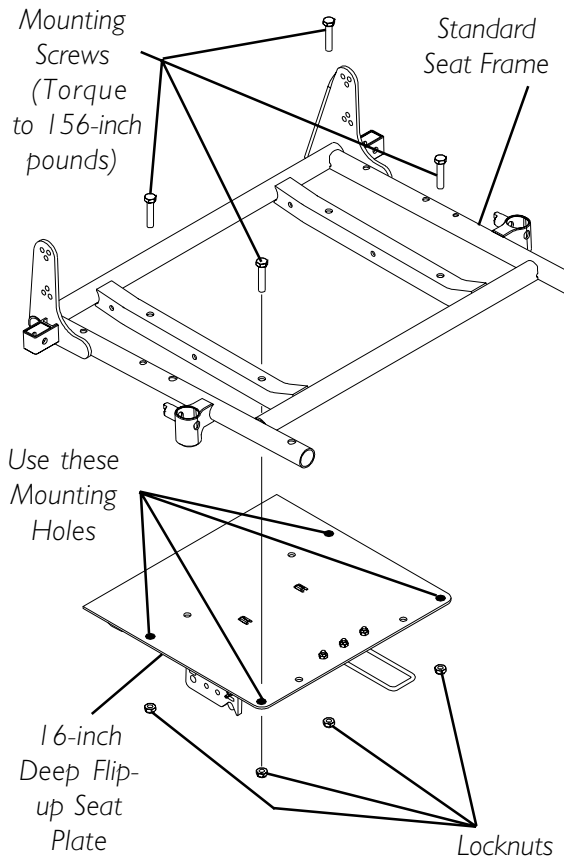
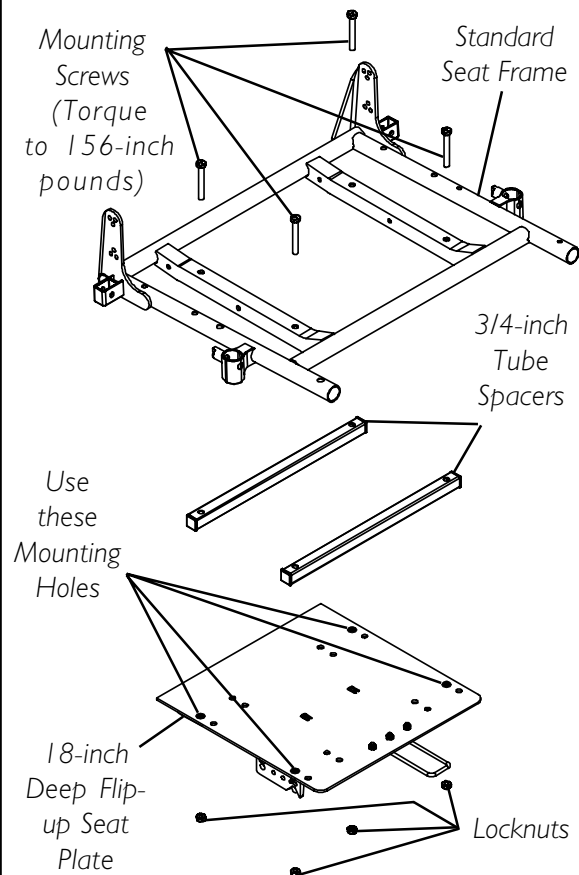
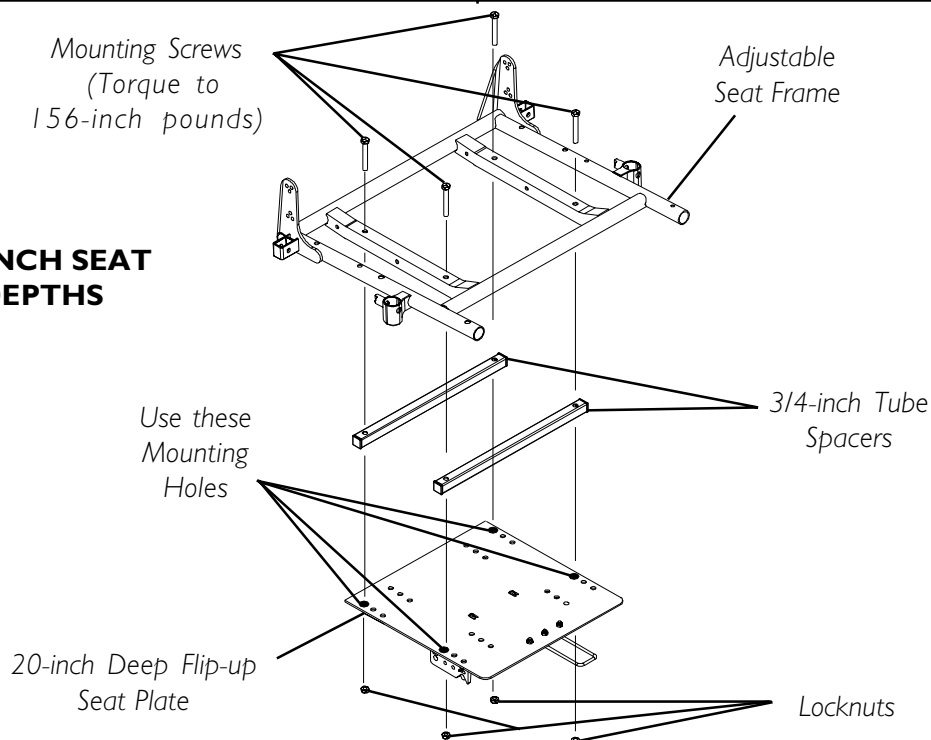
1. Remove the back upholstery from the seat frame. REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.



**FIGURE 7 - REMOVING SEAT FRAME (19 AND 20-INCH SEAT WIDTHS)**

*NOTE: When performing STEP 7 note the mounting location of the mounting screws on the flip-up seat plate for proper reinstallation of the seat frame. Figure 8 illustrates various configurations of how the seat frame is attached to the flip-up seat plate.*

7. Remove the four (4) mounting screws and tube spacers (if applicable) and locknuts that secure the seat frame to the flip-up seat plate.
8. Remove the existing seat frame.

**14,15,16 AND 17-INCH SEAT DEPTHS****18 AND 19-INCH SEAT DEPTHS****20-INCH SEAT DEPTHS****FIGURE 8 - REMOVING/INSTALLING SEAT FRAME (19/20-INCH SEAT WIDTHS)**

**INSTALLING SEAT FRAME FOR 19 AND 20-INCH SEAT WIDTHS  
(FIGURES 7 AND 8)**

1. Secure the seat frame to the flip-up seat plate, in the mounting location noted in the removal section, with the existing four (4) mounting screws, spacers (if applicable) and locknuts. Torque mounting screws to 13 ft/lbs.  $\pm$  20%. (FIGURE 8)
2. Perform one (1) of the following:
  - A. **For 14 and 15-inch seat depths:**
    1. Secure each CJ bracket to the seat frame with the two (2) washers and locknuts. Torque locknuts to 75 in./lbs. (FIGURE 7)
    2. Install the back upholstery onto the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
  - B. **For 16, 17, 18, 19 and 20-inch seat depths:**
    1. Install the back upholstery onto the seat frame. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
3. Install the flip back armrest and secure cable in place with tie wraps. Refer to REMOVING/INSTALLING ARMRESTS in this section of the manual.
4. Install the seat pan. Refer to REMOVING SEAT PAN in this section of the manual.
5. Install the seat cushion.
6. Install the battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
7. Install footrest assemblies. Refer to PROCEDURE 4 in the Owner's Manual, part number I106627.

## CHANGING SEAT DEPTH - FIXED SEAT FRAME AND ADJUSTABLE SEAT FRAME

### FIXED SEAT FRAME

1. Find current seat depth in left hand column in the chart below.
2. Follow that row across underneath SEAT FRAME COMPONENTS.
3. Verify and note the components of the current seat depth.
4. Repeat STEPS 1-3 and note the components for the desired seat depth.

COMPONENT IDENTIFICATION TABLE FOR  
STANDARD SEAT FRAME

SEAT DEPTH	SEAT FRAME COMPONENTS		
	CJ BACK BRACKETS REQUIRED	SEAT PAN	SEAT FRAME DEPTH
14-inches to 15-inches	YES	17-inch	16-inch deep
16-inches	NO	16-inch	16-inch deep
17-inches	NO	17-inch	16-inch deep
18-inches	NO	18-inch	18-inch deep
19-inches	NO	19-inch	18-inch deep
20-inches	NO	20-inch	20-inch deep

5. Compare existing components of the current seat depth and the required components for the desired seat depth.
6. Perform one (1) of the following:
  - A. If the current seat depth and the desired seat depth are within the 14 or 15-inch seat depth range, this change can be accomplished by repositioning the back canes on the CJ back brackets. Refer to CHANGING SEAT DEPTH BETWEEN 14-15-INCHES in this section of the manual.
  - B. For all other seat depth changes, follow the instructions outlined below:

**INCREASING SEAT DEPTH** - In the chart on the following page, find the current seat depth on the left side of the middle column. Scroll down and find desired seat depth on right side of middle column. Perform the procedures in numerical order listed in the **RIGHT** hand side of the chart

**DECREASING SEAT DEPTH** - In the chart, on the following page, find the current seat depth on the right side of the middle column. Scroll down and find desired seat depth on left side of middle column. Perform the procedures in numerical order listed in the **LEFT** hand side of the chart

**Example of decreasing seat depth** - Changing from a 16-inch seat depth to a 14-inch seat depth.

The required steps are located on the left side of the chart in row 1.

STEP 1 is PREPARATIONS which includes removal of footrests, battery boxes, armrests, and back upholstery.

STEP 2 is Installing the CJ Back brackets. CJ back brackets are required to obtain either seat depth of 14 or 15-inches deep.

STEP 3 - Removing the 16-inch seat pan which was determined in the COMPONENT IDENTIFICATION TABLE.

STEP 4 - Install NEW seat pan. 17-inch deep seat pan is required for seat depths of 14 and 15-inches deep. Refer to the COMPONENT IDENTIFICATION TABLE.

STEP 5 - Reassemble chair which includes installing footrests, battery boxes, armrests, and back upholstery.

## DECREASING SEAT DEPTH

## INCREASING SEAT DEPTH

DECREASING SEAT DEPTH								INCREASING SEAT DEPTH									
Reassemble Chair* Install New Seat Frame* Remove Existing Seat Frame* Install New Seat Pan* Remove Existing Seat Pan* Install CJ Back Brackets* Remove CJ Back Brackets* Preparations*								Preparations* Remove CJ Back Brackets* Install CJ Back Brackets* Remove Existing Seat Pan* Install New Seat Frame* Remove Existing Seat Frame* Reassemble Chair*									
Seat Depth								Seat Depth									
5			4	3	2		1	14-15-inch	16-inch	1	2		3	4		5	
3					2		1	14-15-inch	17-inch	1	2					3	
7	4	3	5	2	6		1	14-15-inch	18-inch	1			2	5	3	4	6
7	4	3	5	2	6		1	14-15-inch	19-inch	1			2	5	3	4	6
7	4	3	5	2	6		1	14-15-inch	20-inch	1			2	5	3	4	6
			2	1				16-inch	17-inch				1	2			
6	4	3	5	2			1	16-inch	18-inch	1			2	5	3	4	6
6	4	3	5	2			1	16-inch	19-inch	1			2	5	3	4	6
6	4	3	5	2			1	16-inch	20-inch	1			2	5	3	4	6
6	4	3	5	2			1	17-inch	18-inch	1			2	5	3	4	6
6	4	3	5	2			1	17-inch	19-inch	1			2	5	3	4	6
6	4	3	5	2			1	17-inch	20-inch	1			2	5	3	4	6
			2	1				18-inch	19-inch				1	2			
6	4	3	5	2			1	18-inch	20-inch	1			2	5	3	4	6
6	4	3	5	2			1	19-inch	20-inch	1			2	5	3	4	6

\*NOTE: All procedures are located in this section: PREPARATIONS, REMOVING/INSTALLING CJ BACK BRACKETS, REMOVING/INSTALLING SEAT PAN, REMOVING/INSTALLING SEAT FRAME, and REASSEMBLING THE CHAIR.

## PREPARATIONS

*NOTE: When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of LOCTITE 242 and torque specifications or SECTION 3 of this manual.*

1. Remove footrest assemblies. Refer to PROCEDURE 4 in of the owner's manual, part number 1106627.
2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
5. Remove the flip-back armrests from the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.
6. Remove the back upholstery. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.

## REMOVING/INSTALLING CJ BACK BRACKETS (FIGURE 9)

### Removing.

1. Perform the steps outlined in PREPARATIONS above.
2. Remove the locknuts and washers that secure the CJ back bracket to the back angle plate.
3. Remove the mounting screw and locknut that secures the quick release pin and CJ back bracket and seat positioning strap to the seat frame.
4. Remove the existing CJ back bracket.
5. Repeat procedure for opposite CJ back bracket.

### Installing.

1. Install the threaded studs of the CJ back bracket through the back angle plates as shown in FIGURE 1.

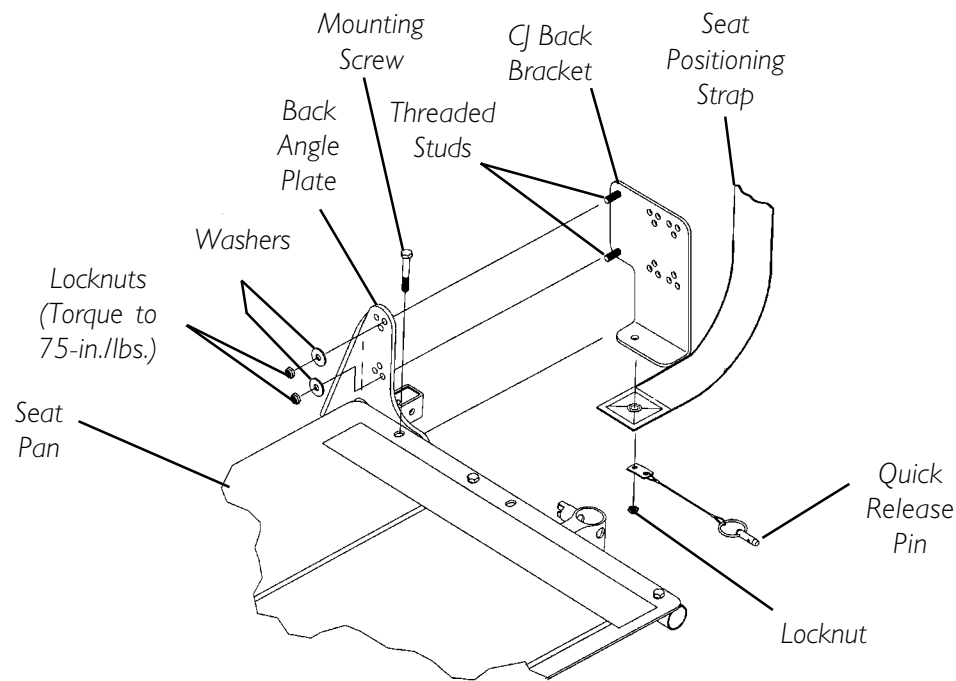
*NOTE: Ensure the CJ back bracket is mounted in the front holes of the back angle plates as shown in FIGURE 9.*

## WARNING

**Always wear your seat positioning strap.**

2. Position the seat positioning strap and quick release pin under the CJ back bracket.
3. Secure the quick release pin, seat positioning strap, and CJ back bracket to the seat frame. Torque to 75-inch pounds.
4. Install washers and locknuts onto the threaded studs of the CJ back bracket. Torque to 75-inch pounds.
5. Perform the steps outlined in REASSEMBLE THE CHAIR.





**FIGURE 9 - REMOVING/INSTALLING CJ BACK BRACKETS**

## **REMOVING/INSTALLING SEAT PAN (FIGURE 10)**

### **Removing.**

1. Remove the seat cushion from the seat pan.
2. Remove the flip-back armrests from the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.
3. Remove the six (6) mounting screws, locknuts, and spacers that secure the seat pan, seat positioning strap, and quick release pin to the seat frame.

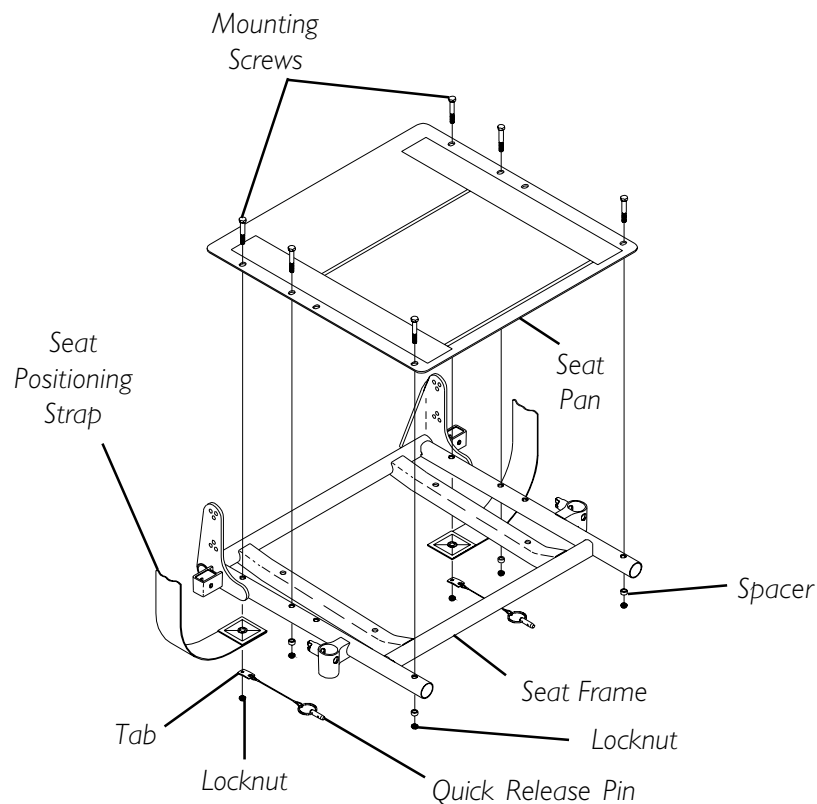
*NOTE: When removing seat pan, note tab position of quick release pin in relation to the seat positioning strap for reinstallation.*

### **Installing.**

1. Position the **NEW** seat pan on the seat frame, aligning the mounting holes of the seat pan and the mounting holes of the seat frame.
2. Position the seat positioning strap and quick release pin tab onto the seat frame and secure with mounting screw and locknut. See FIGURE 9 for proper orientation. Repeat for other seat positioning strap.

*NOTE: Check seat positioning strap for proper length. The width range for the four (4) seat positioning straps are: 12-16-inches wide (Junior), 16-19-inches wide, 20-22-inches wide, and 23-24-inches wide.*

3. Reinstall the remaining mounting screws, locknuts, and spacers. Torque all mounting screws to 75-inch pounds.
4. Remove the protective strips from new seat pan and reinstall the seat cushion onto the seat pan.
5. Perform one (1) of the following:
  - A. When changing the seat width or depth, refer back to that procedure to complete the desired change.



**NOTE:** Illustration shows fixed frame only for clarity. The seat pan removes/installs onto the adjustable seat frame the way.

**FIGURE 10 - REMOVING/INSTALLING SEAT PAN**

### RE-ASSEMBLING THE CHAIR

**NOTE:** When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of **LOCTITE 242** and torque specifications or **SECTION 3** of this manual.

1. Install the back upholstery. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in **SECTION 5** of this manual.
2. Install the flip-back armrests onto the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in **SECTION 4** of this manual.
3. Install the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
4. Install the seat cushion.
5. Install battery box(es). Refer to INSTALLING/REMOVING BATTERIES in **SECTION 8** of this manual.
6. Install footrest assemblies. Refer to **SECTION 4** in of the owner's manual, part number **I106627**.

**ADJUSTABLE SEAT FRAME (FIGURE 11)**

1. Find current seat depth in left hand column in the chart.
2. Follow that row across to underneath seat frame components.
3. Verify and note the components of the current seat depth.
4. Repeat STEPS 1-3 and note components for the desired seat depth.
5. Compare existing components of the current seat depth and the required components for the desired seat depth.

**COMPONENT IDENTIFICATION TABLE  
FOR STANDARD SEAT FRAME**

SEAT DEPTH	SEAT FRAME COMPONENTS			
	CJ BACK BRACKETS REQUIRED	SEAT PAN	SIDE FRAME	CENTER FRAME
14-inches or 15-inches	YES	17-inch	Short	Short
16-inches	NO	16-inch	Short	Short
17-inches	NO	17-inch	Short	Short
18-inches	NO	18-inch	Medium	Short
19-inches	NO	19-inch	Medium	Short
20-inches	NO	20-inch	Long	Long

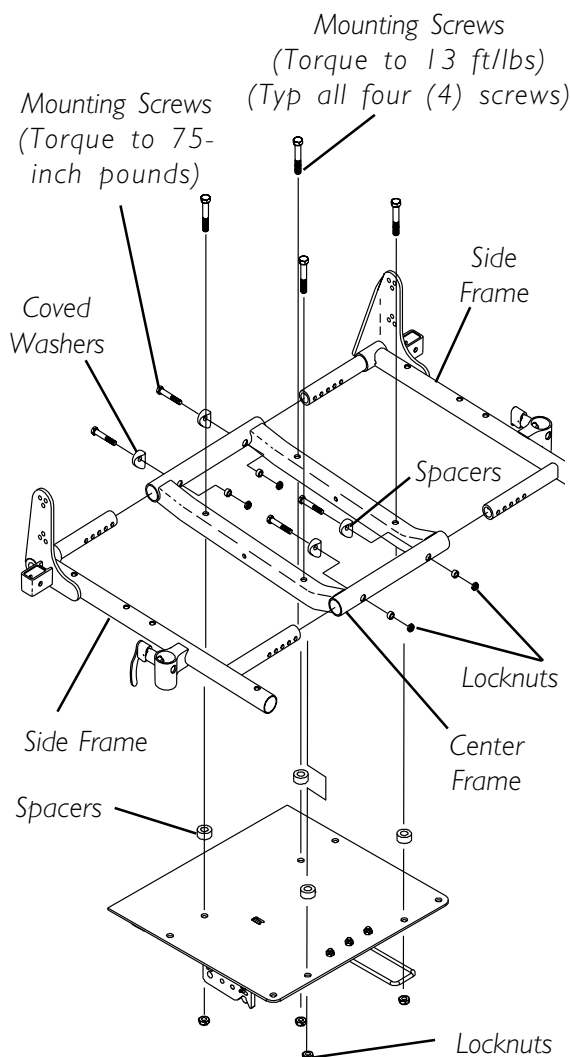
*NOTE: Note the four (4) different lengths of side frames short, medium, long, and X-long, as well as the two different center frames, short and long. These components are interchanged to obtain the various different seat depths.*

6. To adjust the depth of the seat on the wheelchair, use the following guidelines:
  - A. If the current seat depth and the desired seat depth are within the 14-15-inch seat depth range, this change can be accomplished by repositioning the back canes on the CJ back brackets. Refer to CHANGING SEAT DEPTH BETWEEN 14-15-INCHES in this section of the manual.
  - B. If the desired change only requires a NEW seat pan, (i.e. changing from 16-inch to 17-inch, or 18-inch to 19-inch, refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
  - C. If the desired change requires the removal/installation of CJ back brackets, refer to REMOVING/INSTALLING CJ BACK BRACKETS in this section of the manual.
  - D. If the desired change requires a new side frame, and/or new center frame, perform the following steps:
    1. Remove footrest assemblies. Refer to PROCEDURE 4 in the Owner's manual, part number 1106627.
    2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
    3. Remove the seat cushion.
    4. Remove the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
    5. Remove flip back armrest. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 of this manual.
    6. Remove the back upholstery from the seat frame. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.

6. Perform one (1) of the following:
  - A. **For 14 and 15-inch seat depths:**
    1. Remove the back upholstery from the CJ back brackets. Refer to **REMOVING/INSTALLING BACK UPHOLSTERY** in SECTION 5 of this manual.
    2. Remove the two (2) washers and locknuts that secure each CJ bracket to the seat frame.
  - B. **For 16, 17, 18, 19 and 20-inch seat depths:**

*NOTE: Note the mounting hole position of the side frame for proper installation of the NEW side frame.*
7. Remove the two (2) mounting screws, coved washers, spacers, and locknuts that secure the side frame to the center frame.
8. Remove the side frame from the center frame.
9. If the desired seat depth requires a new center frame, perform following, otherwise proceed to STEP 10.
  - Remove the four (4) mounting screws and spacers (if applicable) that secure the EXISTING center frame to the flip-up seat plate.
  - Remove existing center frame from flip-up seat plate.
  - Secure NEW center frame to flip-up seat plate with the existing four (4) mounting screws, spacers (if applicable) and locknuts. Torque to 13 ft/lbs.
10. Secure NEW side frame to the center frame at the position noted previously. Torque to 75-inch pounds.

*NOTE: If seat width adjustment is also desired, refer to **CHANGING SEAT WIDTH** in this section of the manual for mounting hole locations and allowable seat width/seat depth combinations.*



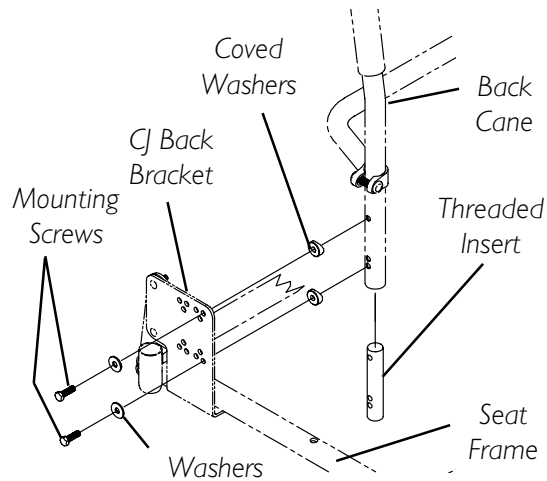
**FIGURE 11 - CHANGING SEAT DEPTH - ADJUSTABLE SEAT FRAME**

## CHANGING SEAT DEPTH BETWEEN 14 AND 15-INCHES (FIGURE 12)

1. Remove the armrests from the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.
2. Cut the tie wraps that secure the back upholstery to the CJ back brackets.
3. Pull the bottom of the back upholstery away from the rear of the seat pan.
4. Remove mounting screw, washer and coved washer from the top mounting hole of the CJ back bracket and back cane.

**NOTE:** Before removing the back canes from the CJ back brackets, note the **BACK ANGLE** for reinstallation.

**NOTE:** To avoid losing the insert in each back cane, line up the holes in the insert with the holes in the back cane and start one of the screws through the cane from the inside of the wheelchair to hold the insert in place.



**FIGURE 12 - ADJUSTING SEAT DEPTH - CHANGING SEAT DEPTH BETWEEN 14 AND 15-INCHES**

5. Remove the mounting screw, washer and coved washer from the bottom mounting hole of the CJ back bracket and the back cane.
6. Reposition the back cane to the desired seat depth and angle. If changing the back angle as well, refer to BACK ANGLE ADJUSTMENT in SECTION 5 of this manual.
7. Secure bottom of the back upholstery to the seat pan.
8. Secure the bottom of the back upholstery to the CJ back brackets with new tie wraps.
9. Use LOCTITE 242 and torque the mounting screws to 75-inch pounds.
10. Repeat the STEPS 1-9 for the opposite back cane.
11. Reinstall the armrests onto the wheelchair. Refer to INSTALLING/REMOVING FLIP BACK ARMRESTS in SECTION 4 of this manual.

## CHANGING SEAT WIDTH OF FIXED SEAT FRAMES (16, 17, 18, 19, AND 20-INCH WIDE)

**NOTE:** If desired seat width is below 16-inches wide, you must use an adjustable seat frame. When doing so remember to transfer the CJ back brackets from the existing fixed seat frame and install onto the NEW adjustable seat frame. For all fixed seat width changes above 16-inches wide or fixed seat frame, perform the following.

1. Perform one (1) of the following:
  - A. Remove the existing 16-inch width seat frame.
  - B. Remove the existing 17/18-inch width seat frame.
  - C. Remove the existing 19/20-inch width seat frame.

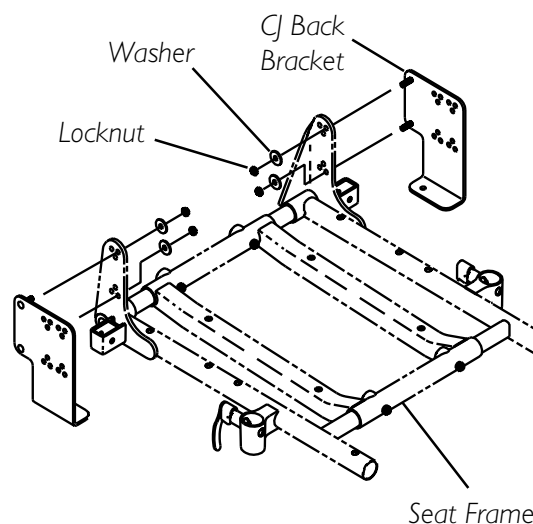
2. Perform one (1) of the following:
  - A. Install the NEW 16-inch width seat frame.
  - B. Install the NEW 17/18-inch width seat frame.
  - C. Install the NEW 19/20-inch width seat frame.

*NOTE: Remember when changing the seat width NEW back upholstery, spreader bar (if applicable), and seat pan are required.*

## CHANGING SEAT WIDTH OF ADJUSTABLE SEAT FRAMES (14, 15, AND 16-INCH WIDE) (FIGURES 13 AND 14)

*NOTE: If desired seat width is above 16-inches wide, a fixed seat frame is required. For all changes below 16-inches wide, perform the outlined steps below.*

1. Remove footrest assemblies. Refer to PROCEDURE 4 in of the owner's manual, part no. 1106627.
2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to REMOVING SEAT PAN in this section of the manual.
5. Remove flip back armrest. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 of this manual.
6. Perform one (1) of the following:
  - A. **For 14 and 15-inch seat depths:**
    1. Remove the back upholstery from the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
    2. Remove the two (2) washers and locknuts that secure each CJ bracket to the seat frame.
  - B. **For 16, 17, 18, 19 and 20-inch seat depths:**
    1. Remove the back upholstery from the seat frame. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.



**FIGURE 13 - REMOVING/INSTALLING SEAT FRAME FOR 14 AND 15-INCH SEAT WIDTHS**

7. Review the chart below for the allowable seat width and seat depth combinations for the adjustable seat frame.

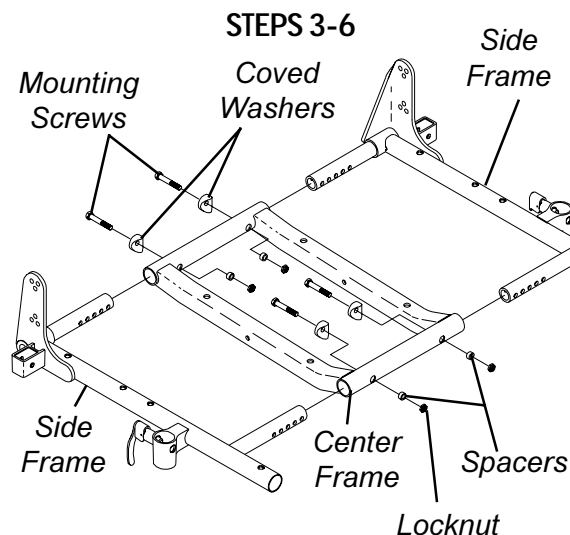
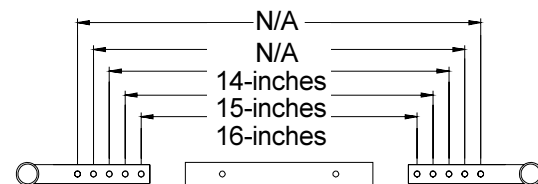
**NOTE:** The seat widths and seat depths enclosed in the outlined box will require the use of CJ back brackets and a 17-inch deep seat pan.

8. Remove the two (2) mounting screws, coved washers, spacers, and locknuts that secure the side frame to the center frame.
9. Adjust side frame to desired width determined from STEP 7. See DETAIL "A" for proper mounting hole position.
10. Secure side frame to center frame with existing mounting screws, coved washers, spacers, and locknuts. Torque mounting screws to 75-inch pounds.
11. Remove flip back armrest. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 in this manual.
12. Remove the seat pan. Refer to REMOVING SEAT PAN in this section of the manual.
13. Remove the seat cushion.
14. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
15. Remove footrest assemblies. Refer to PROCEDURE 4 in of the owner's manual, part no. 1106627.

### DETAIL "A"

### ALLOWABLE SEAT WIDTH AND DEPTH COMBINATIONS FOR ADJUSTABLE SEAT FRAME

Seat Depth	Seat Width				
	12	13	14	15	16
12	N/A	N/A	N/A	N/A	N/A
13	N/A	N/A	N/A	N/A	N/A
14	N/A	N/A	✓	✓	✓
15	N/A	N/A	✓	✓	✓
16	N/A	N/A	✓	✓	✓
17	N/A	N/A	✓	✓	✓
18	N/A	N/A	✓	✓	✓
19	N/A	N/A	✓	✓	✓
20	N/A	N/A	✓	✓	✓
21	N/A	N/A	✓	✓	✓
22	N/A	N/A	✓	✓	✓



**FIGURE 14 -CHANGING SEAT WIDTH - ADJUSTABLE SEAT FRAME**

## COMPONENT REPLACEMENT FOR 14-INCH, 15-INCH, AND 16-INCH SEAT FRAMES (ADJUSTABLE SEAT FRAME) (FIGURE 15)

1. Remove footrest assemblies. Refer to PROCEDURE 4 in of the Owner's Manual, part number 1106627.
2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
3. Remove the seat cushion.
4. Remove the seat pan. Refer to REMOVING/INSTALLING SEAT PAN in this section of the manual.
5. Remove flip back armrest. Refer to REMOVING/INSTALLING ARMRESTS in SECTION 4 of this manual.
6. Perform one (1) of the following:
  - A. **For 14 and 15-inch seat depths:**
    1. Remove the back upholstery from the CJ back brackets. Refer to REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.
    2. Remove the two (2) washers and locknuts that secure each CJ bracket to the seat frame.
  - B. **For 16, 17, 18, 19 and 20-inch seat depths:**
    1. Remove the back upholstery from the seat frame. REMOVING/INSTALLING BACK UPHOLSTERY in SECTION 5 of this manual.



## REPLACING ONE (1) SIDE FRAME

**NOTE:** Note the mounting hole position of the current side frame for proper installation of the NEW side frame.

1. Remove the two (2) mounting screws, coved spacers, spacers, and locknuts that secure the side frame to the center frame.
2. Install new side frame into existing center frame at the mounting position previously noted. Torque to 75-inch pounds.

## REPLACING BOTH SIDE FRAMES

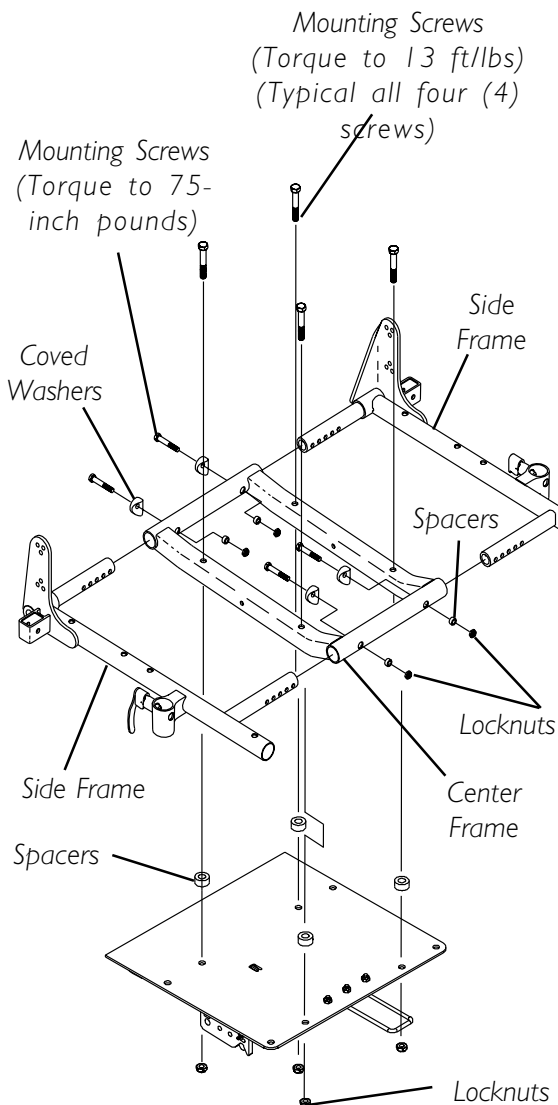
**NOTE:** Note the mounting hole position of the current side frame(s) for proper installation of the NEW side frame(s).

1. Remove the two (2) mounting screws, coved spacers, spacers, and locknuts that secure the side frame to the center frame. Repeat for opposite side frame.
2. Install new side frame into existing center frame at the mounting position previously noted and secure with two (2) mounting screws, coved spacers, spacers, and locknut. Torque to 75-inch pounds. Repeat for opposite side frame.

## REPLACING CENTER FRAME

**NOTE:** Note the mounting hole position of the current side frame(s) for proper installation side frame into the center side frame.

1. Remove the two (2) mounting screws, coved spacers, spacers, and locknuts that secure the side frame to the center frame. Repeat for opposite side frame.
2. Remove the four (4) mounting screws spacers (if applicable) and locknuts that secure the seat frame to the flip-up seat plate.
3. Secure NEW center frame to flip-up seat plate with existing four (4) mounting screws and locknuts. Torque to 13 ft/lbs.



**FIGURE 15- COMPONENT REPLACEMENT FOR 14-INCH, 15-INCH, AND 16-INCH SEAT FRAMES (ADJUSTABLE SEAT FRAME)**

## WARNING

**Both side frames MUST be adjusted to the same mounting hole position to maintain proper weight balance of user and seat frame. If weight is not balanced, injury to the assistant and/or user and damage to the wheelchair may result.**

4. Install existing side frame(s) into NEW center frame at the mounting position previously noted with two (2) mounting screws, coved spacers, spacers, and locknuts. Torque to 75-inch pounds.

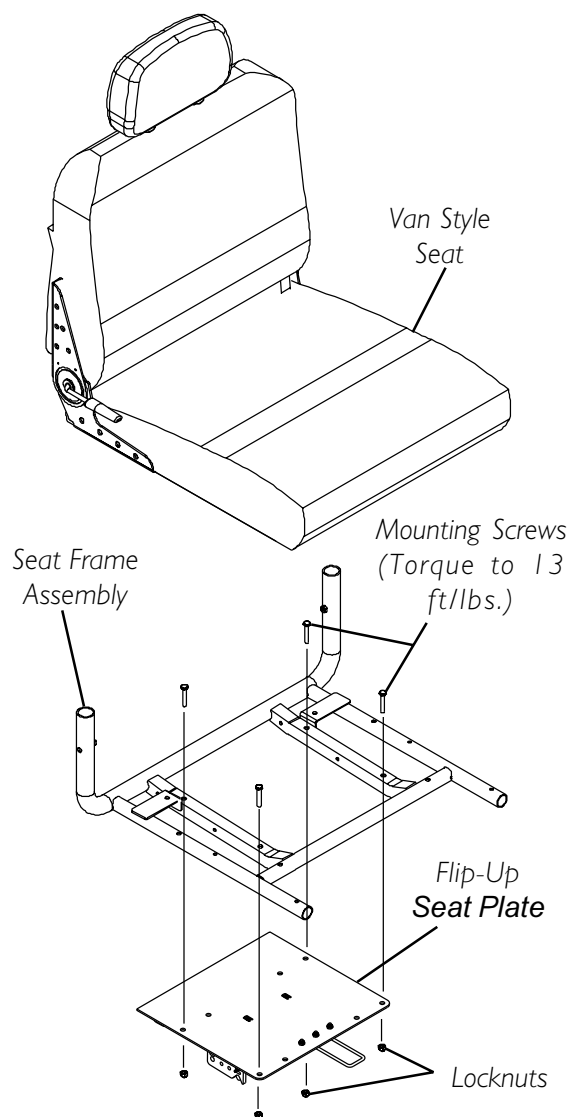
## INSTALLING/REMOVING VAN STYLE SEAT/SEAT FRAME ASSEMBLY ONTO/ FROM FLIP-UP SEAT PLATE (FIGURE 16)

### REMOVING

1. Remove footrest assemblies. Refer to PROCEDURE 4 in of the Owner's Manual, part number 1106627.
2. Remove battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
3. Remove armrests. Refer to REMOVING/INSTALLING ARMRESTS in PROCEDURE 4 in this manual.
4. Remove the four (4) locknuts from the mounting screws that secure the van style seat and seat frame assembly to the flip-up seat plate.
5. Remove van style seat and seat frame assembly.

### INSTALLING

1. Position the van style seat/seat frame assembly on the flip-up seat plate at the mounting position shown.
2. Secure the van style seat/seat frame Assembly to the flip-up seat plate with four (4) mounting screws and locknuts. Torque to 13 ft/lbs.
3. Install armrests. Refer to REMOVING/INSTALLING ARMRESTS in PROCEDURE 4 in this manual.
4. Install battery box(es). Refer to INSTALLING/REMOVING BATTERIES in SECTION 8 of this manual.
5. Install footrest assemblies. Refer to PROCEDURE 4 in of the Owner's Manual, part number 1106627.



**FIGURE 16 - REMOVING/  
INSTALLING VAN STYLE SEAT/  
SEAT FRAME ASSEMBLY**

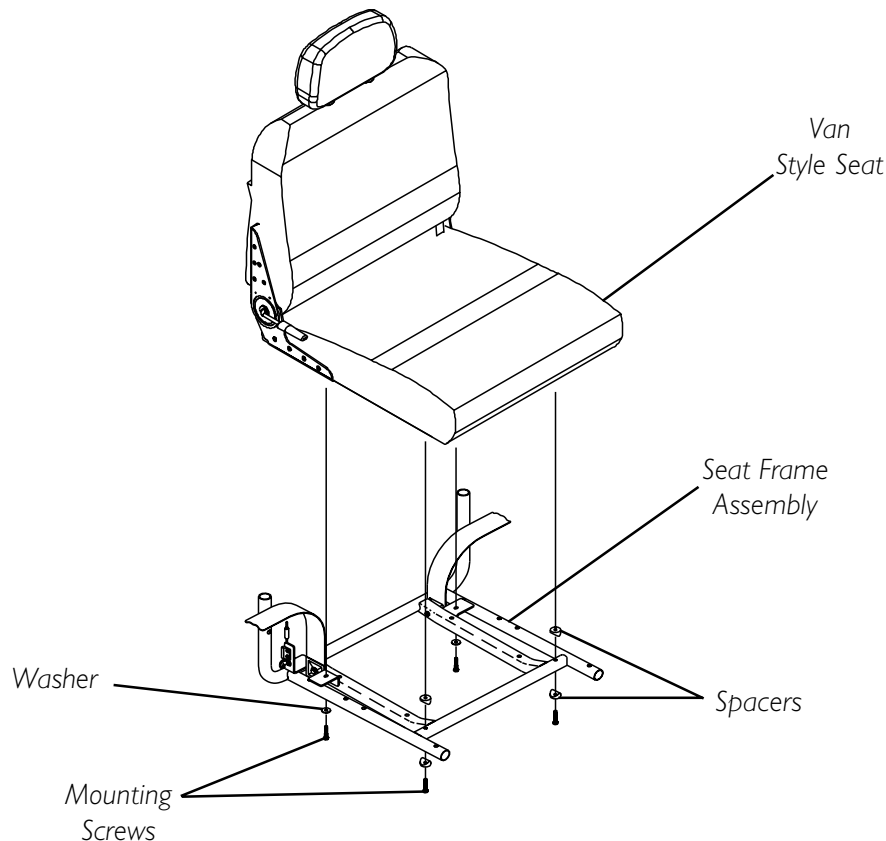
## INSTALLING/REMOVING VAN STYLE SEAT ONTO/FROM SEAT FRAME ASSEMBLY (FIGURE 17)

### REMOVING

1. Remove the van style seat/seat frame assembly from the flip-up seat plate. Refer to INSTALLING/REMOVING VAN STYLE SEAT/SEAT FRAME ASSEMBLY ONTO/FROM FLIP-UP SEAT PLATE in this section of the manual.
2. Remove the four (4) mounting screws, spacer, and washers that secure the van style seat to the seat frame assembly.
3. Remove van style seat

### INSTALLING

1. Position the van style seat on seat frame assembly at the mounting position shown.
2. Secure the van style seat to the seat frame assembly with four (4) mounting screws, spacers and washers. Torque to 13 ft/lbs.
3. Install the van style seat/seat frame assembly from the flip-up seat plate. Refer to INSTALLING/REMOVING VAN STYLE SEAT/SEAT FRAME ASSEMBLY ONTO/FROM FLIP-UP SEAT PLATE in this section of the manual.



**FIGURE 17 - INSTALLING/REMOVING VAN STYLE SEAT ONTO/ FROM SEAT FRAME ASSEMBLY**

***This Section Includes the Following:***

***Removing/Installing Flip-up Seat Plate***  
***Removing/Installing Adjustment Bracket***  
***Removing/Installing Front/Rear Shrouds***  
***Removing/Installing Torsion Bar***

***Removing/Installing Port Bracket***  
***Removing/Installing Battery Tray***  
***Replacing Components of Flip-up Seat Plate - Changing from 3° tilt to 0° tilt***

**WARNING**

**After ANY adjustments, repair or service and BEFORE use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.**

**REMOVING/INSTALLING FLIP-UP SEAT PLATE (FIGURE 1)**

*NOTE: When installing/replacing components of the wheelchair, refer to the individual procedure for correct use of LOCTITE 242 and torque specifications or SECTION 3 of this manual.*

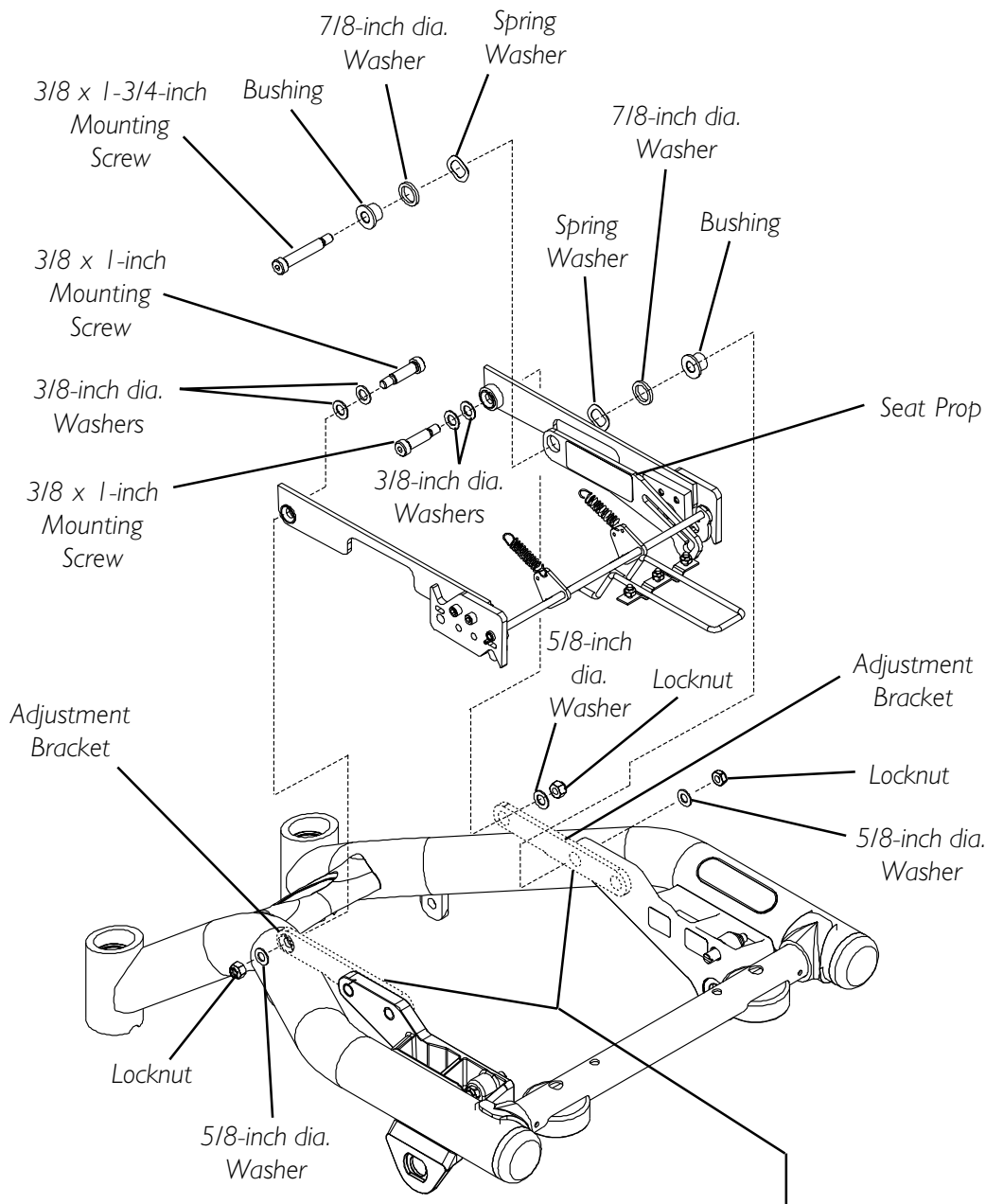
*NOTE: Right and Left are determined from the user's seated position.*

**REMOVING**

1. Remove the seat frame. Refer to one (1) of the procedures in SECTION 6 of this manual:
  - A. REMOVING/INSTALLING SEAT FRAME FOR 14 AND 15-INCH SEAT WIDTHS.
  - B. REMOVING/INSTALLING SEAT FRAME FOR 16-INCH SEAT WIDTHS.
  - C. REMOVING/INSTALLING SEAT FRAME FOR 17 AND 18-INCH SEAT WIDTHS.
  - D. REMOVING/INSTALLING SEAT FRAME FOR 19 AND 20-INCH SEAT WIDTHS.
  - E. INSTALLING/REMOVING VAN STYLE SEAT/SEAT FRAME ASSEMBLY ONTO/ FROM FLIP-UP SEAT PLATE
2. Remove the 3/8 x 1-inch mounting screw, two (2) 3/8-inch diameter washers, 5/8-inch diameter washer, and locknut that secures the right side of the flip-up seat plate to the adjustment bracket.
3. Remove the 3/8 x 1-inch mounting screw, two (2) 3/8-inch diameter washers, 5/8-inch diameter washer, and locknut that secures the left side of the flip-up seat plate to the adjustment bracket.
4. Remove the 1-3/4-inch mounting screw, two (2) bushings, two (2) 7/8-inch dia. washer, two (2) spring washers, 5/8-inch dia. washer, and locknut that secures the seat prop to adjustment bracket.

**INSTALLING**

1. Secure the seat prop to adjustment bracket with one (1) 1-3/4-inch mounting screw, two (2) bushings, two (2) 7/8-inch diameter washer, two (2) spring washers, 5/8-inch diameter washer, and locknut. Torque to 13 ft./lbs.
2. Secure the left side of the flip-up seat plate to the adjustment bracket with one (1) 3/8 x 1-inch mounting screw, two (2) 3/8-inch diameter washers, 5/8-inch diameter washer, and locknut. Torque to 13 ft./lbs.
3. Secure the right side of the flip-up seat plate to the adjustment bracket with one (1) 3/8 x 1-inch mounting screw, two (2) 3/8-inch diameter washers, 5/8-inch diameter washer, and locknut. Torque to 13 ft./lbs.
4. Install the seat frame. Refer to one (1) of the procedures in SECTION 6 of this manual:
  - A. REMOVING/INSTALLING SEAT FRAME FOR 14 AND 15-INCH SEAT WIDTHS.
  - B. REMOVING/INSTALLING SEAT FRAME FOR 16-INCH SEAT WIDTHS.
  - C. REMOVING/INSTALLING SEAT FRAME FOR 17 AND 18-INCH SEAT WIDTHS.
  - D. REMOVING/INSTALLING SEAT FRAME FOR 19 AND 20-INCH SEAT WIDTHS.
  - E. INSTALLING/REMOVING VAN STYLE SEAT/SEAT FRAME ASSEMBLY ONTO/ FROM FLIP-UP SEAT PLATE



NOTE: Top of the Flip-up seat plate not shown for clarity of attaching hardware.

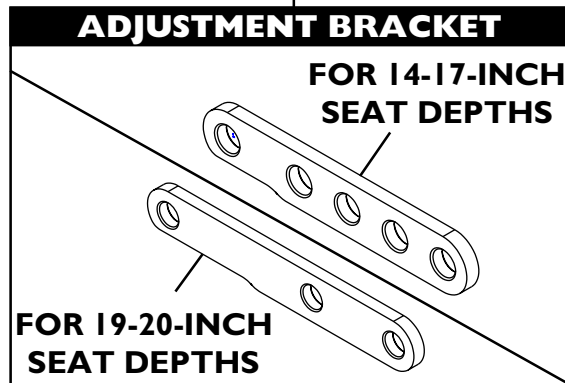


FIGURE 1 - REMOVING/INSTALLING FLIP-UP SEAT PLATE

## REMOVING/INSTALLING ADJUSTMENT BRACKET (FIGURE 2)

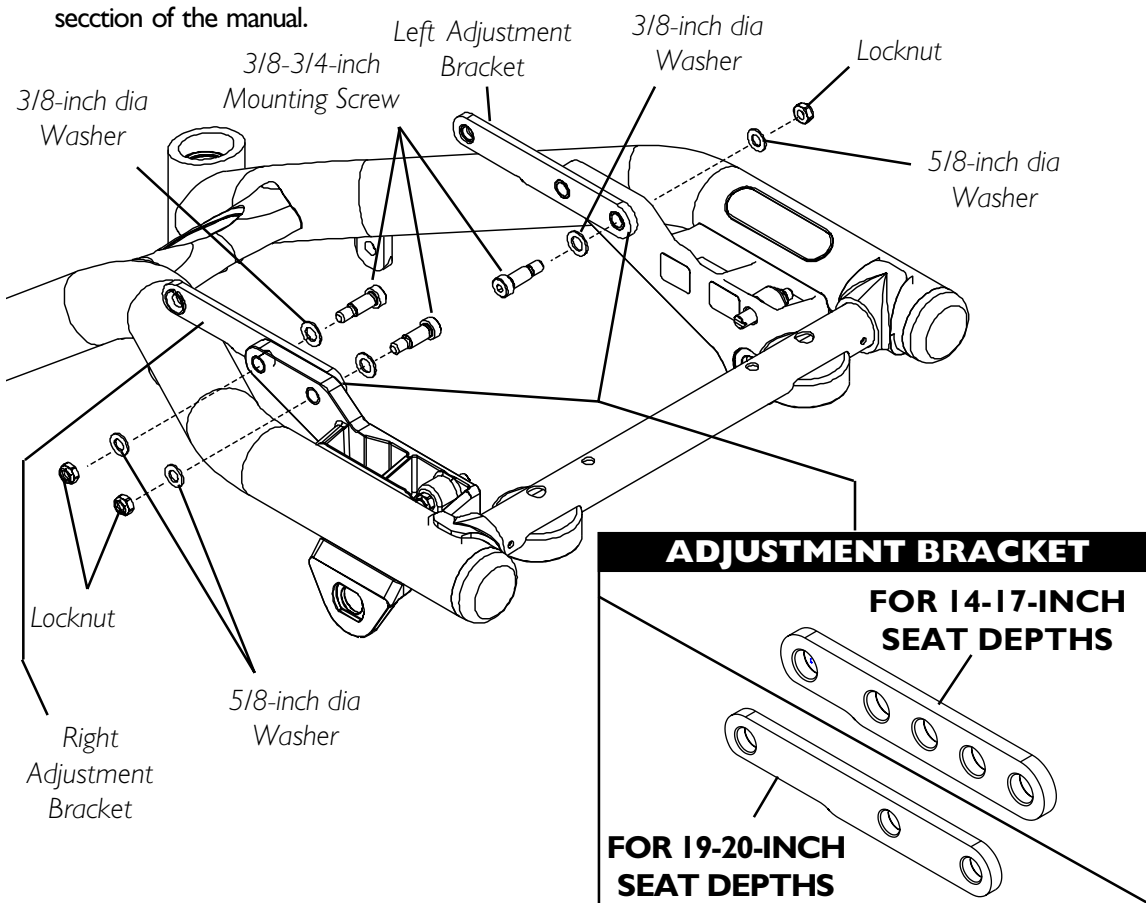
**NOTE:** When installing/replacing components of the wheelchair, refer to the individual section for correct use of **LOCTITE 242** and torque specifications or **SECTION 3** of this manual.

### REMOVING

1. Remove the flip-up seat plate. Refer to **REMOVING/INSTALLING FLIP-UP SEAT PLATE** in this section of the manual.
2. Remove the two (2) 3/8 x 3/4-inch mounting screw, two (2) 3/8-inch dia. washers, two (2) 5/8-inch dia. washer, and locknut that secure the right adjustment bracket to the base frame.
3. Remove the right adjustment bracket.
4. Remove the 3/8 x 3/4-inch mounting screw, 3/8-inch dia. washers, 5/8-inch dia. washer, and locknut that secures the left adjustment bracket to the base frame.
5. Remove the left adjustment bracket.

### INSTALLING

1. Secure the left adjustment bracket to the base frame with one (1) 3/8 x 3/4-inch mounting screw, 3/8-inch dia. washers, 5/8-inch dia. washer, and locknut. Torque to 13 ft/lbs.
2. Secure the right adjustment bracket to the base frame with two (2) 3/8 x 3/4-inch mounting screws two (2) 3/8-inch dia. washers, two (2) 5/8-inch dia. washer, and locknuts. Torque to 13 ft/lbs.
3. Install the flip-up seat plate. Refer to **REMOVING/INSTALLING FLIP-UP SEAT PLATE** in this section of the manual.



**FIGURE 2 - REMOVING/INSTALLING ADJUSTMENT BRACKET**

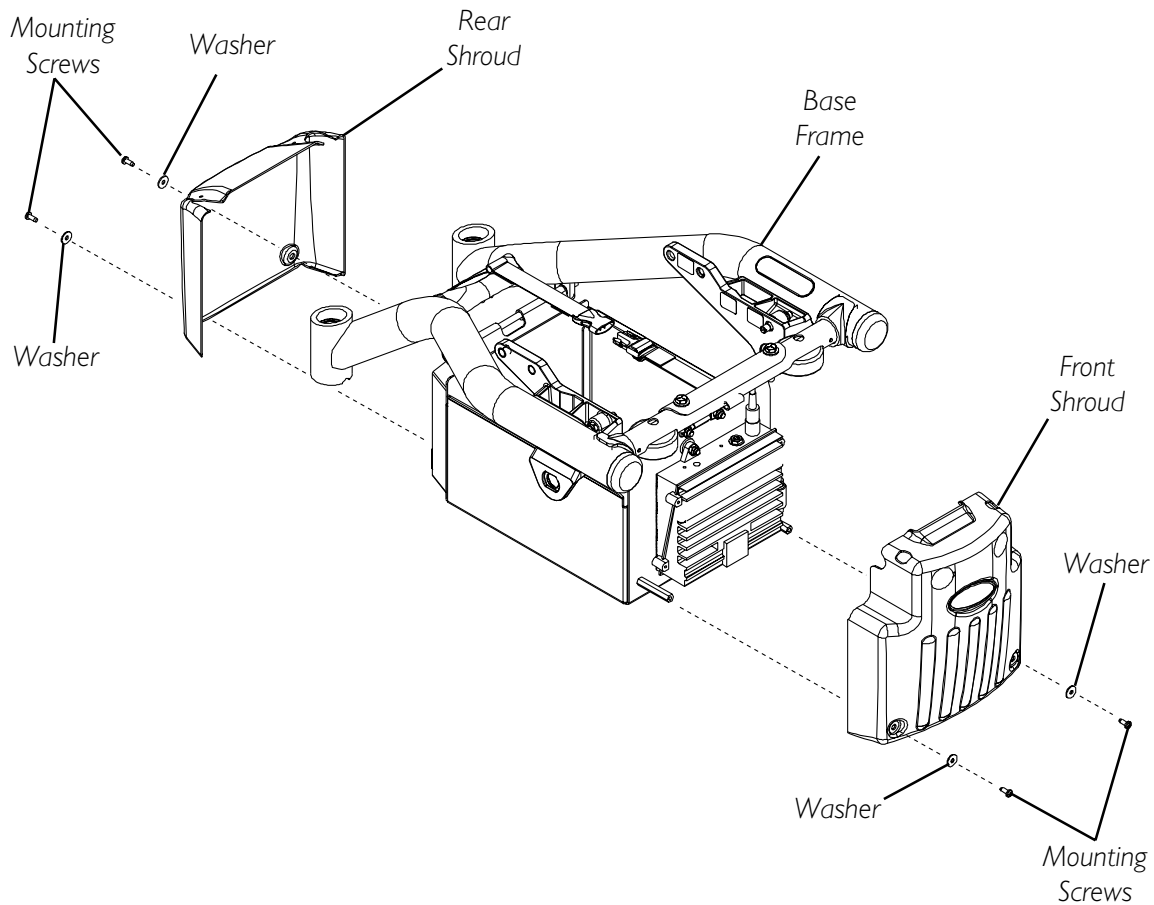
## REMOVING/INSTALLING THE FRONT AND REAR SHROUDS (FIGURE 3)

### REMOVING

1. Remove the two (2) mounting screws and washers that secure the front or rear shroud to the base frame.
2. Remove shroud.

### INSTALLING

1. Position shroud in place and secure with two (2) mounting screws and washers. Torque mounting screws to 40-in./lbs.



**FIGURE 3 - REMOVING/INSTALLING THE FRONT AND REAR SHROUDS**

## REMOVING/INSTALLING TORSION BAR (FIGURE 4)

Definition: The torsion bar serves two purposes 1.) it keeps the right and left suspension arms in alignment and 2.) provides a more defined driving performance.

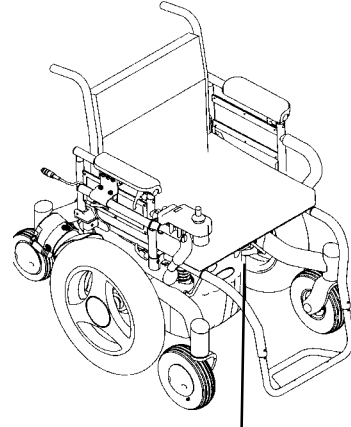
### REMOVING

1. Because of the tight tolerance, removing the hitch pin clip from both ends of the torsion bar must be performed by the following:
  - A. With a pair of pliers, grab the bottom of the pin and push up.
  - B. With an elongated screw driver, pop the hitch pin out by catching the top loop and prying upward.
2. Pull torsion bar forward to remove.

### INSTALLING

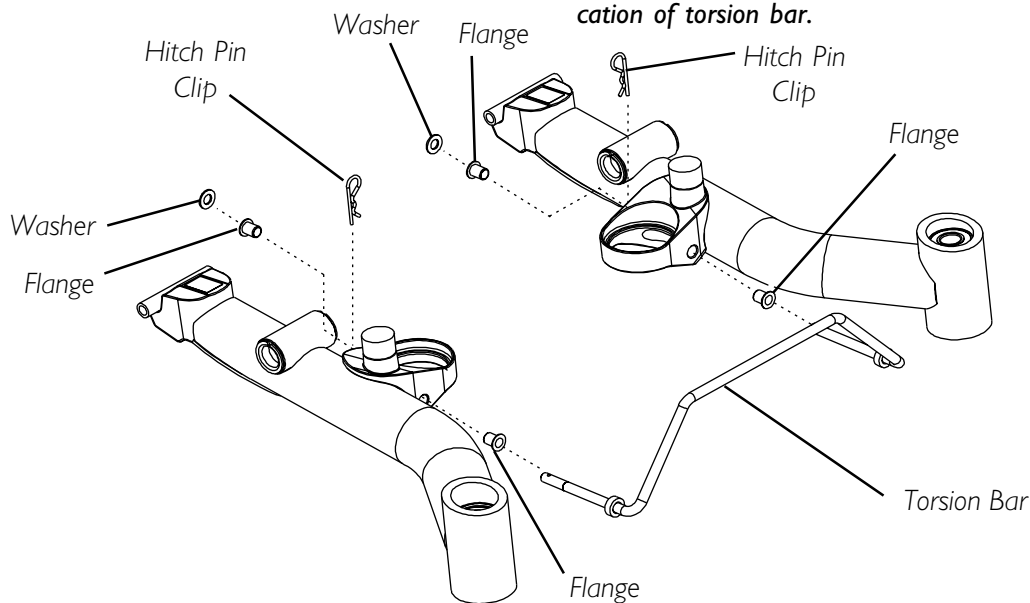
1. Position torsion bar in base frame as shown in FIGURE 4.
2. Secure torsion bar in place with two (2) hitch pin clips. See DETAIL "B".

#### DETAIL "A"

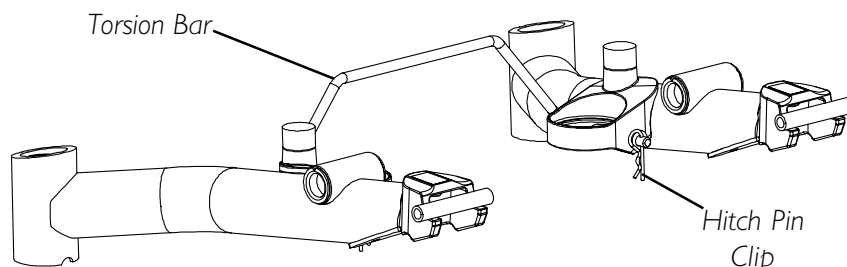


*Torsion Bar located in this area*

NOTE: Detail "A" is provided to show general location of torsion bar.



#### DETAIL "B" - REVERSE VIEW



**FIGURE 4 - REMOVING/INSTALLING TORSION BAR**



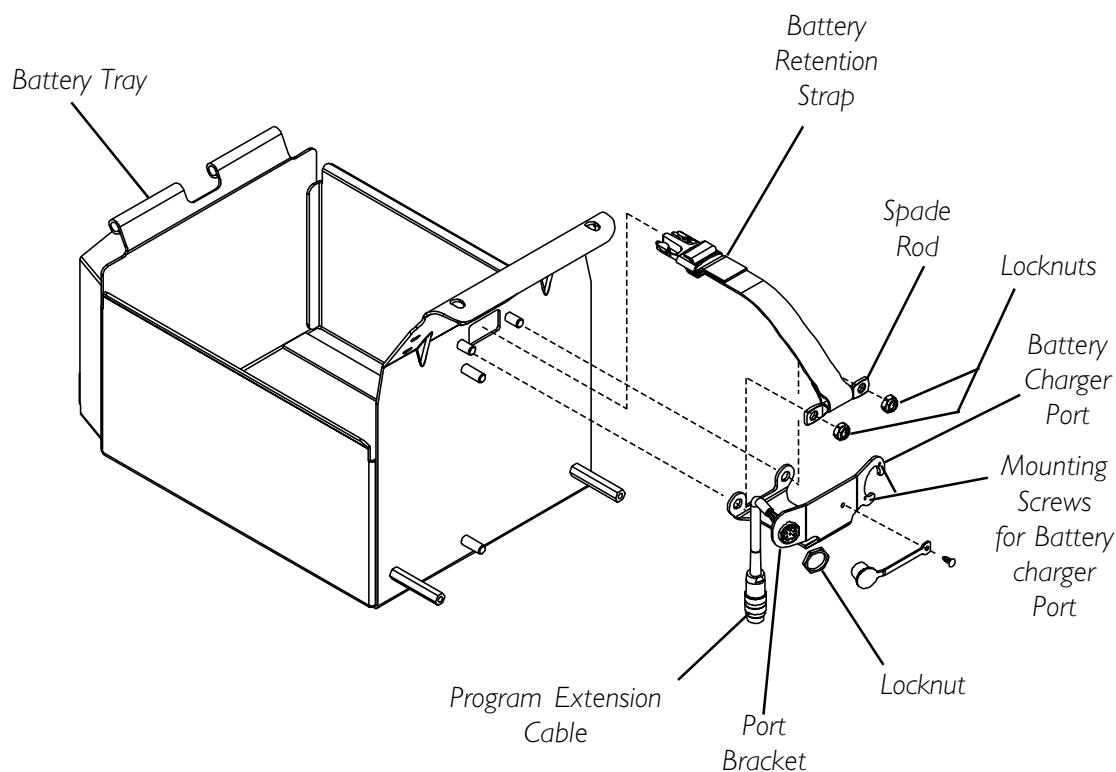
## REMOVING/INSTALLING PORT BRACKET (FIGURE 5)

### REMOVING

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUDS in this section of the manual.
3. Remove the two (2) mounting screws that secure the battery charger port to the port bracket.
4. Remove the locknut that secures the program extension cable to the charger port.
5. Remove the two (2) locknuts that secure the spade rod, battery retention strap and charger port bracket to the front of the battery tray.

### INSTALLING

1. Secure the program extension cable to the charger port with locknut.
2. Secure the spade rod, battery retention strap and charger port bracket to the front of the battery tray with two locknuts. Torque locknuts to 75-in./lbs.
3. Secure the battery charger port to the port bracket with two (2) mounting screws. Securely tighten.
4. Install the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUDS in this section of the manual.
5. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.



**FIGURE 5 - REMOVING/INSTALLING PORT BRACKET**

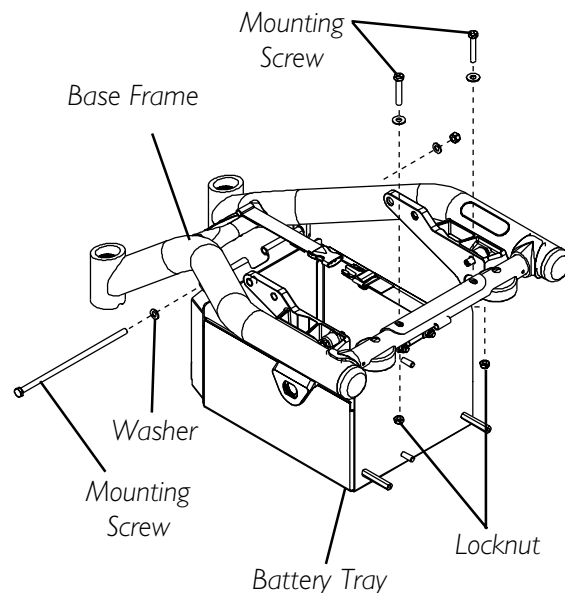
## REMOVING/INSTALLING BATTERY TRAY (FIGURE 6)

### REMOVING

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the seat. Refer to REMOVING/INSTALLING SEAT FRAME in SECTION 6 of this manual.
3. Remove the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUD in this section of the manual.
4. Remove the controller. Refer to REMOVING/INSTALLING CONTROLLER in SECTION 9 of this manual.
5. Remove the wiring harness. Refer to REMOVING/INSTALLING WIRING HARNESS in SECTION 9 of this manual.
6. Remove the right drive wheel to gain access to the rear mounting screw that secures the battery tray in place. Refer to REMOVING/INSTALLING DRIVE WHEELS in SECTION 10 of this manual.
7. Remove the two (2) mounting screws, washers, and locknut that secures the front of the battery tray to the base frame.
8. Remove the mounting screw, washers, and locknut that secures the rear of the battery tray to the base frame.
9. Remove battery tray from base frame.

### INSTALLING

1. Secure the rear of the battery tray to the base frame with the mounting screw, washers, and locknut. Torque mounting screw to 75-in./lbs.
2. Secure the front of the battery tray to the base frame with two (2) mounting screws, washers, and locknut. Torque mounting screws to 75-in./lbs.
3. Install the right drive wheel. Refer to REMOVING/INSTALLING DRIVE WHEELS in SECTION 10 of this manual.
4. Install the wiring harness. Refer to REMOVING/INSTALLING WIRING HARNESS in SECTION 9 of this manual.
5. Install the controller. Refer to REMOVING/INSTALLING CONTROLLER in SECTION 9 of this manual.
6. Install the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUDS in SECTION 9 of this manual.
7. Install the seat. Refer to REMOVING/INSTALLING SEAT FRAME in SECTION 6 of this manual.
8. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 6 of this manual.



**FIGURE 6 -REMOVING/  
INSTALLING BATTERY TRAY**

## REPLACING COMPONENTS OF THE FLIP-UP SEAT PLATE AND/OR CHANGING FROM 3° TILT TO 0° TILT AND VICE VERSA (FIGURE 7)

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the seat. Refer to REMOVING/INSTALLING SEAT FRAME in SECTION 6 of this manual.
3. Remove the flip-up seat plate. Refer to REMOVING/INSTALLING FLIP-UP SEAT PLATE in this section of the manual.
4. Lay flip-up seat plate upside down on flat surface as shown in FIGURE 7.
5. Remove the two (2) mounting screws that secure the handle release bracket to the seat plate and prop threaded plate.
6. Remove the two (2) mounting screws that secure the remaining handle release bracket to the threaded plate.
7. Remove the three (3) mounting screws that secure the release handle to the flip up seat plate.
8. Remove the release handle from the hook release assembly by squeezing the two ends together.
9. Remove the end of the spring from the hook release assembly.

**NOTE:** If replacing any components, discard existing component and use new component when reassembling.

10. Install spring in desired hole location of hook release assembly for 0° or 3° tilt. Refer to CHART A in FIGURE 7 for proper mounting hole location.
11. Secure the release handle to the flip-up seat plate with three (3) mounting screws.  
Torque to 25-in./lbs.

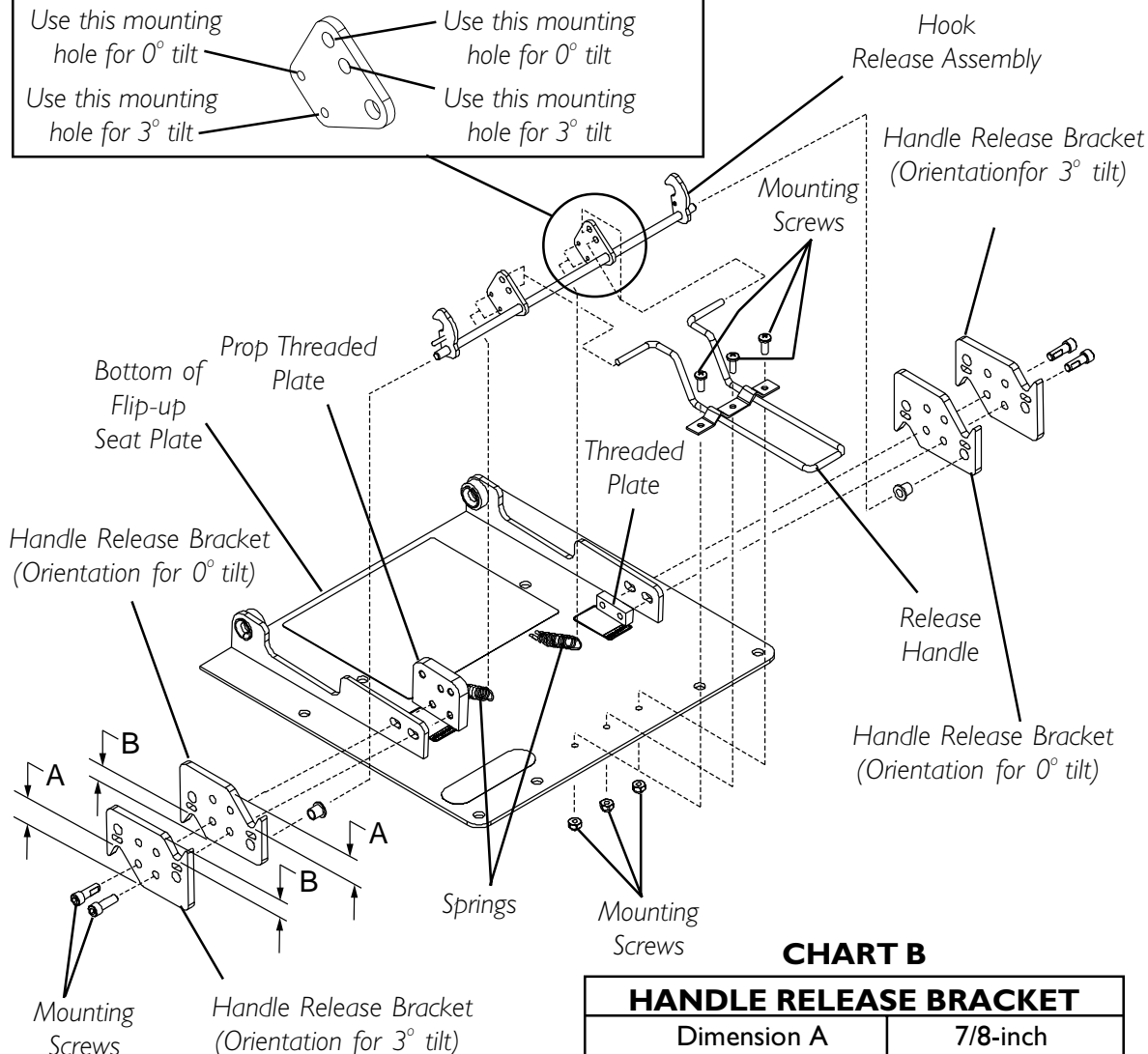
**NOTE:** The degree of tilt for mounting of the spring and the release handle must correspond, otherwise flip-up seat plate will not work properly. EX. if the spring is mounted for 0° tilt then the release handle must also be mounted for 0° tilt.

12. Position the ends of the release handle in the desired hole location of hook release assembly for 0° or 3° tilt. Refer to CHART A in FIGURE 7 for proper mounting hole location.
13. Determine proper mounting orientation of the handle release bracket for 0° or 3° tilt. Refer to CHART B in FIGURE 7 for proper mounting orientation.
14. Install end of hook release assembly with flanged bushing in proper mounting hole of release handle bracket
15. Secure handle release bracket to prop threaded plate with two (2) mounting screws. Hand tighten.
16. Install end of hook release assembly with flanged bushing in proper mounting hole of release handle bracket
17. Secure remaining handle release bracket to threaded plate with two (2) mounting screws at same degree of tilt determined in STEP 13. Hand tighten.
18. Securely tighten mounting screws from STEPS 15 and 17.

19. If a NEW flip-up seat plate is being used with a different seat depth, then perform the following: (DETAIL "A")
  - A. Remove the mounting screw, small washer, two (2) large washers that secures the prop seat bracket to the prop threaded plate.
  - B. Re-secure the prop seat bracket in the proper mounting hole of the prop threaded.
20. Install the flip-up seat plate. Refer to REMOVING/INSTALLING FLIP-UP SEAT PLATE in this section of the manual.
21. Install the seat. Refer to REMOVING/INSTALLING SEAT FRAME in SECTION 6 of this manual.
22. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.

### CHART A

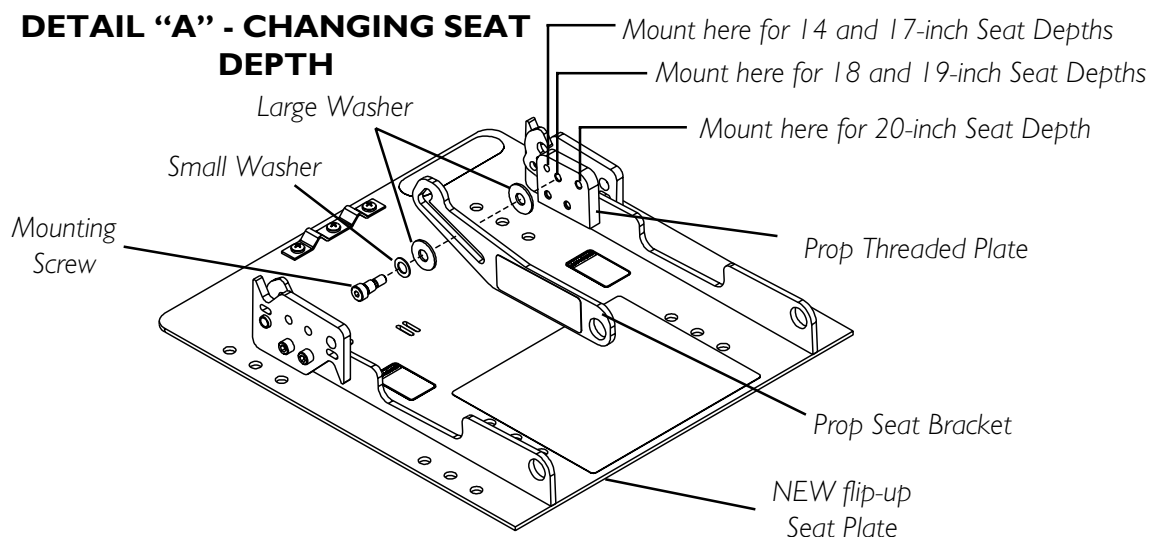
SPRING	RELEASE HANDLE
Use this mounting hole for 0° tilt	Use this mounting hole for 0° tilt
Use this mounting hole for 3° tilt	Use this mounting hole for 3° tilt



### CHART B

HANDLE RELEASE BRACKET	
Dimension A	7/8-inch
Dimension B	9/16-inch

### DETAIL "A" - CHANGING SEAT DEPTH



**FIGURE 7 - COMPONENTS OF THE FLIP-UP SEAT PLATE AND/OR CHANGING FROM 3° TILT TO 0° TILT AND VICE VERSA**

***This Procedure Includes the Following:***

***Installing/Removing Batteries***  
***Disconnecting Battery Cables***  
***Connecting Battery Cables***  
***When to Charge Batteries***  
***Charging Batteries***  
***Replacing Batteries***

**WARNING**

Make sure power to the wheelchair is **OFF** before performing this procedure.

The use of rubber gloves and chemical goggles is recommended when working with batteries.

Invacare strongly recommends that battery installation and battery replacement always be done by a qualified technician.

After **ANY** adjustments, repair or service and **BEFORE** use, make sure all attaching hardware is tightened securely - otherwise injury or damage may result.

This procedure **MUST** be performed while the wheelchair is unoccupied.

**REMOVING/INSTALLING BATTERIES (FIGURE 1)****WARNING**

Each battery weighs 35 pounds. Use proper lifting techniques (lift with your legs) to avoid injury.

Failure to use the correct battery size and/or voltage may cause damage to your wheelchair and give you unsatisfactory performance.

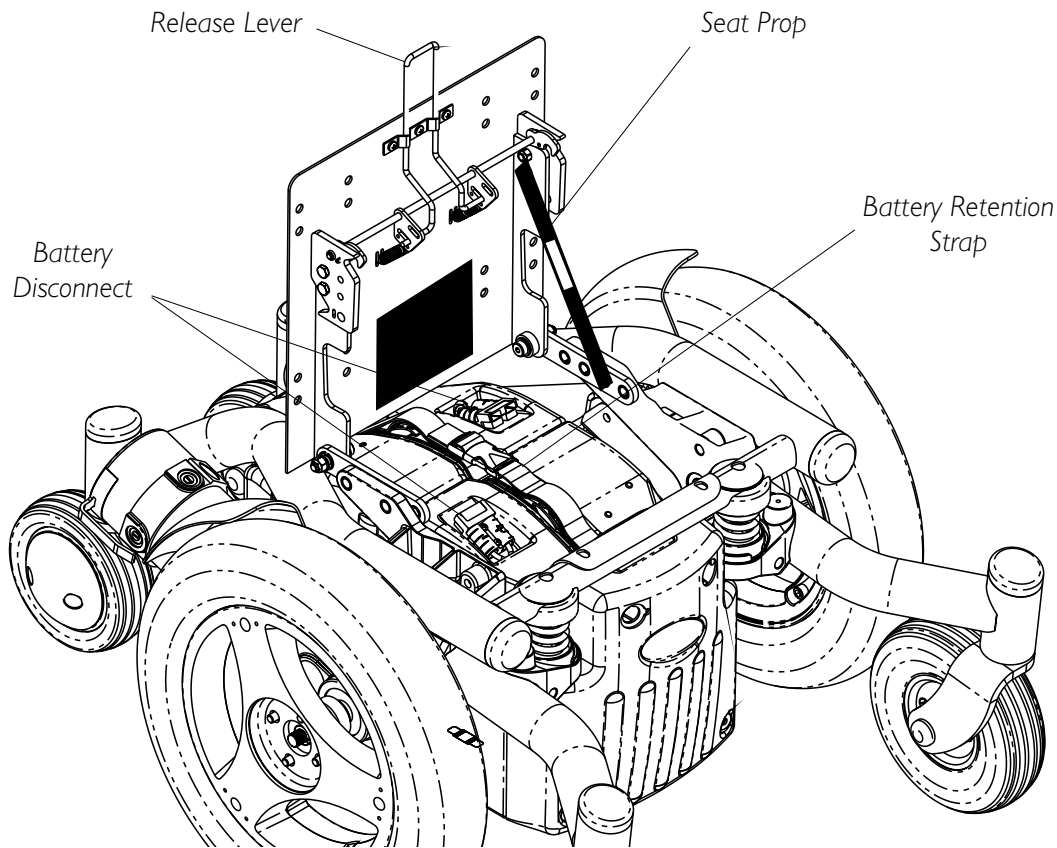
**ALWAYS** use a battery lifting strap when lifting a battery. It is the most convenient method and assures that the battery acid will not spill. It also helps to prolong the life of the battery.

**DO NOT** tip the batteries. Keep the batteries in an upright position.

*NOTE: If there is battery acid in the bottom of the battery tray or on the sides of the battery(ies), apply baking soda to these areas to neutralize the battery acid. Before reinstalling the NEW or existing battery(ies), clean the baking soda from the battery tray or battery(ies).*

**REMOVING (FIGURE 1)**

1. Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.
2. Verify the joystick ON/OFF switch is in the OFF position.
3. Pull release lever located underneath the front of the seat to disengage (FIGURE 1).
4. Tilt seat backward and lock seat in upward position with seat prop (FIGURE 1).
5. Disconnect the battery wiring harness from the front battery (FIGURE 1).
6. Disconnect battery wiring harness from the rear battery (FIGURE 1).
7. Disconnect the battery retention strap (FIGURE 1).
8. Lift the front battery out of the base frame (DETAIL "A" in FIGURE 2).
9. Slide rear battery forward and lift out of base frame (DETAIL "B" in FIGURE 2).

**FIGURE 1 - REMOVING/INSTALLING BATTERIES****INSTALLING (FIGURE 2)**

1. Install the rear battery into the base frame in the orientation shown in DETAIL “B” in FIGURE 2 .
2. Slide the rear battery rearward.
3. Install the front battery into the base frame in the orientation shown in DETAIL “A” in FIGURE 2 .
4. Connect the battery retention strap (FIGURE 1).
5. Connect the battery wiring harness to the rear battery (FIGURE 1).
6. Connect the battery wiring harness to the front battery (FIGURE 1).

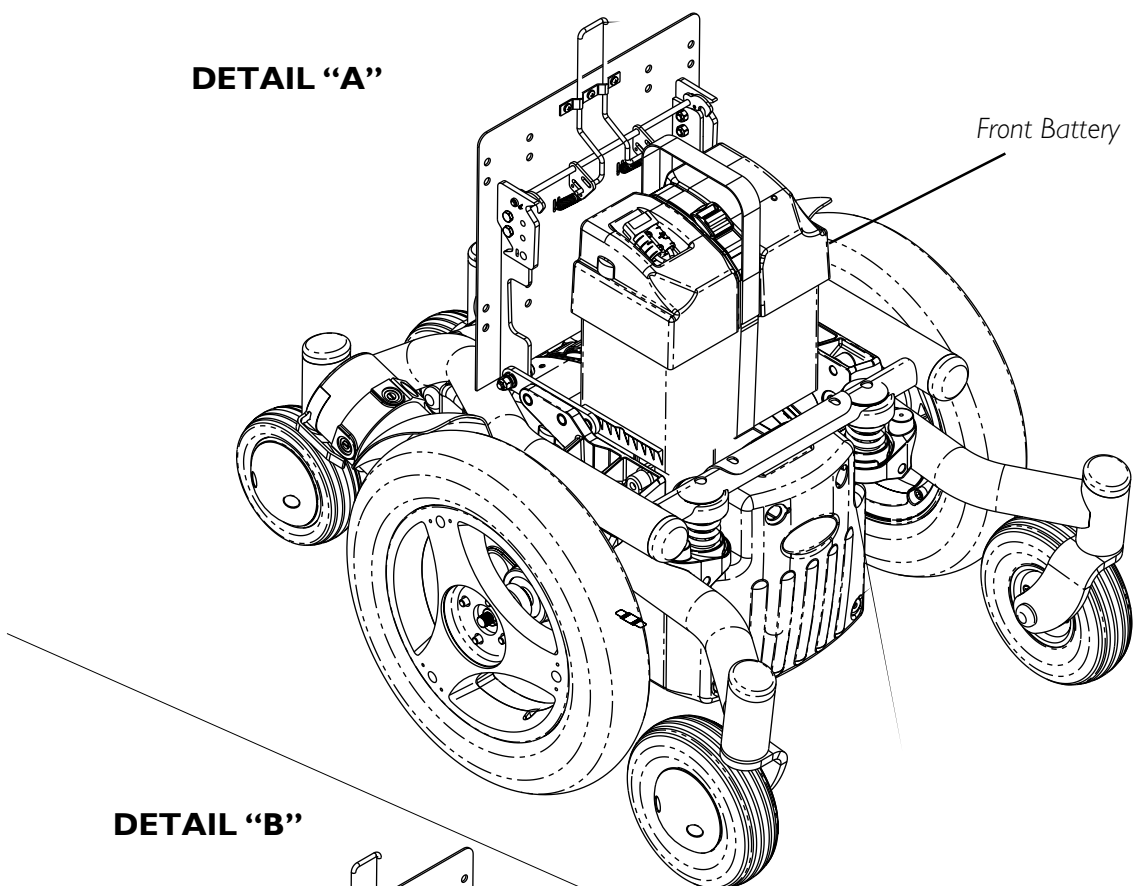
**WARNING**

**When lowering the seat, ensure that hands and fingers are clear from underneath seat before lowering, otherwise, injury may result.**

**After lowering seat, ensure that seat is locked securely in place before operating chair, otherwise serious personal injury, damage to the wheelchair and/or damage to surrounding property may occur.**

7. To lower seat: Lift up on seat with one hand. While holding seat, pull prop toward the front of the seat. Lower seat.

DETAIL "A"



DETAIL "B"

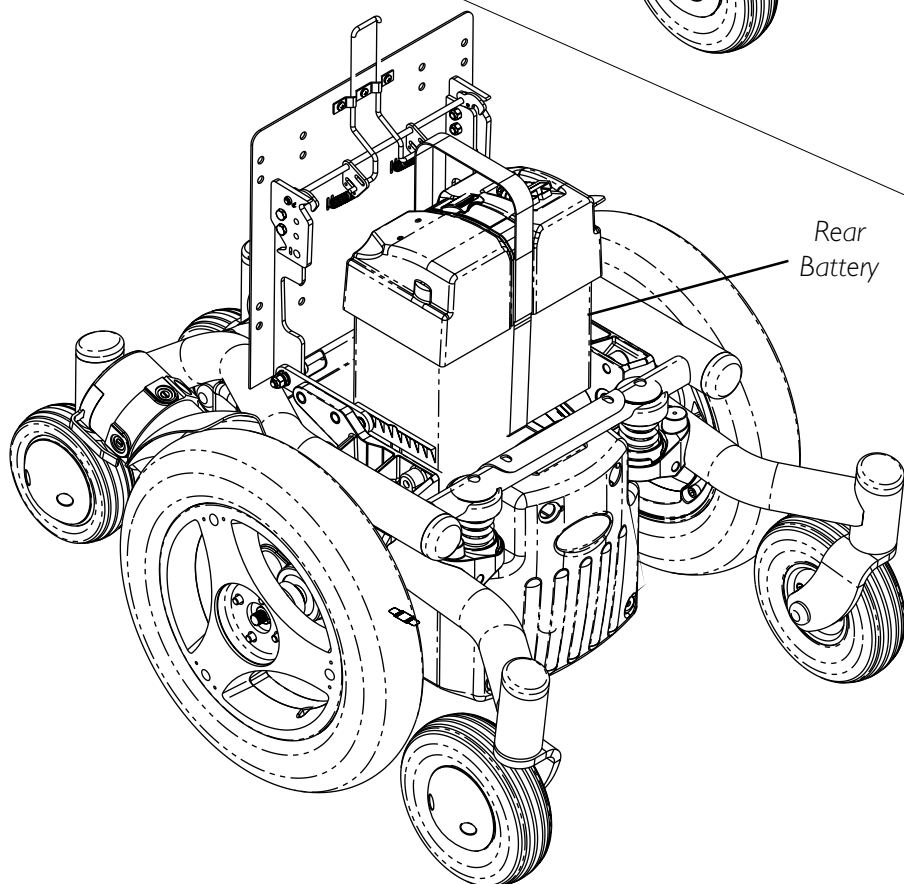


FIGURE 2 - REMOVING/INSTALLING BATTERIES



**DISCONNECTING BATTERY CABLES (FIGURE 3)****WARNING**

**NEVER** allow any of your tools and/or battery cable(s) to contact **BOTH** battery terminal(s)/ post(s) at the same time. An electrical short may occur and serious personal injury or damage may occur.

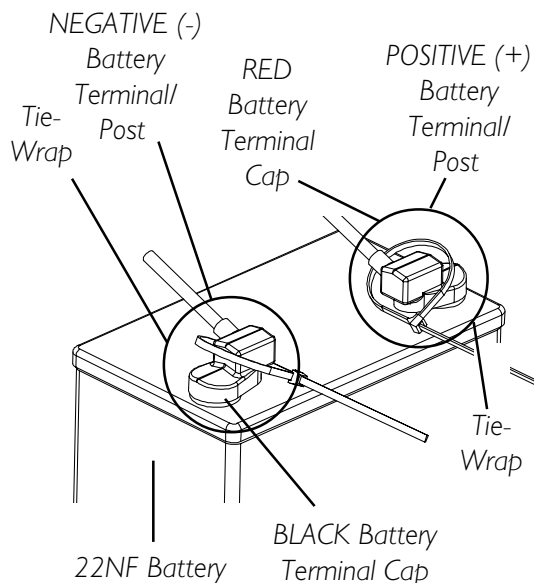
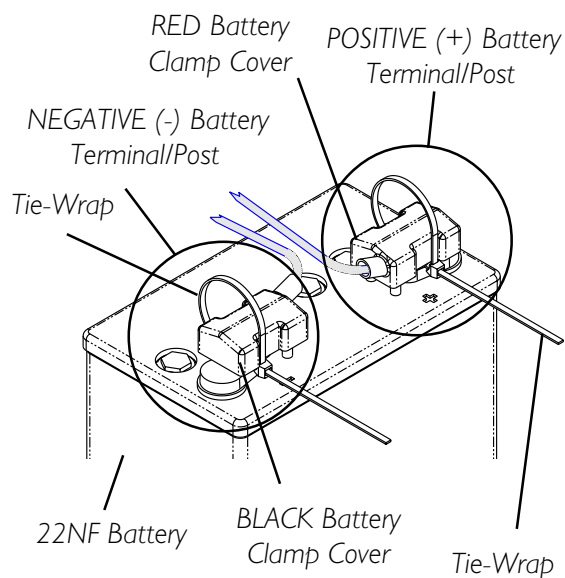
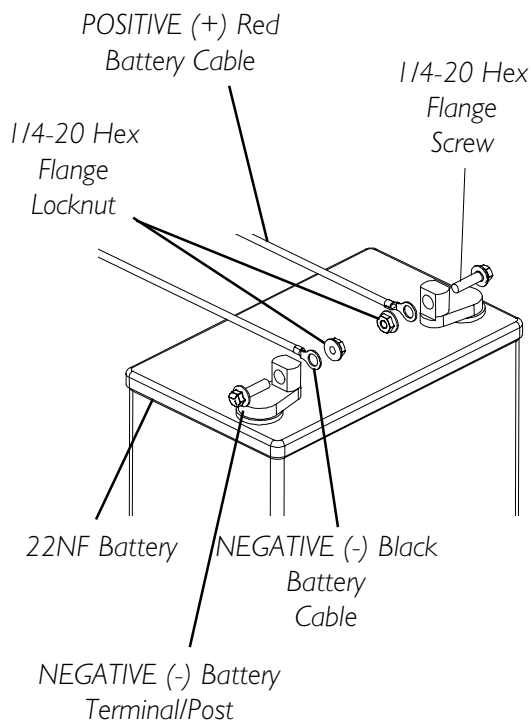
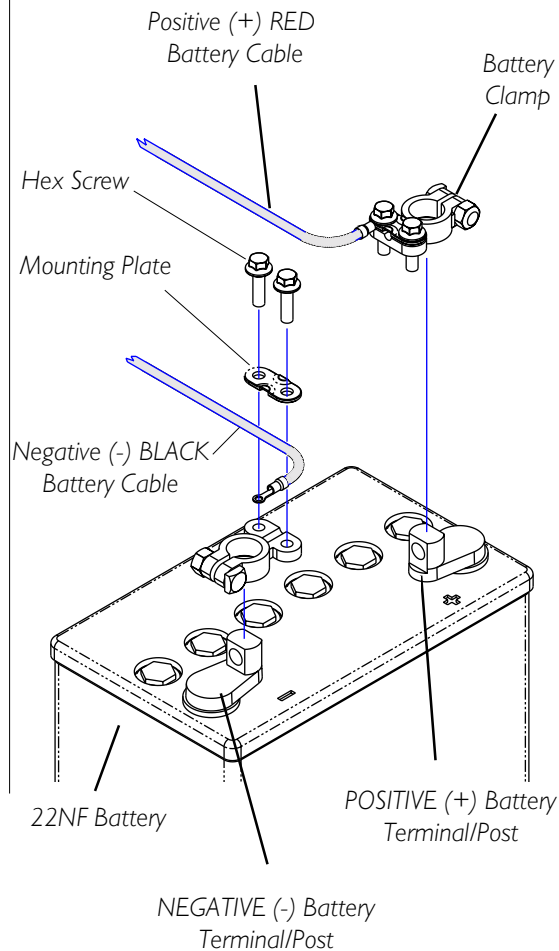
The use of rubber gloves and chemical goggles is recommended when working with batteries.

*NOTE: Perform this procedure on one (1) battery and battery box at a time. Repeat procedure for other battery box.*

1. Disconnect the strap that secures the lid to the battery.
2. Lift up on battery box lid to expose underlying cables.
3. Cut the tie wraps that secure the battery covers to the terminals.
4. Perform one (1) of the following:
  - A. **Direct Mount Method** - Peel back battery covers to expose ring terminal on each battery cable as follows:
    - RED battery cover from RED battery cable.
    - BLACK battery cover from BLACK battery cable.
  - B. **Battery Clamp Method** - Peel back battery covers to expose battery clamp on each battery cable as follows:
    - RED battery clamp cover from RED battery cable.
    - BLACK battery clamp cover from BLACK battery cable.
3. Perform one (1) of the following:
  - A. **Direct Mount Method**
    - Remove the hex screw and locknut that secures the NEGATIVE (-) black battery cable to the negative battery terminal/post.
    - Remove the hex screw and locknut that secures the POSITIVE (+) red battery cable to the positive battery terminal/post.
  - B. **Battery Clamp Method**
    - Remove the hex screw that secures the NEGATIVE (-) black battery cable to the battery clamp of the positive battery terminal/post.
    - Remove the hex screw that secures the POSITIVE (+) red battery cable to the battery clamp of the positive battery terminal/post.

*NOTE: To transfer battery clamps to new battery, perform the following:*

- Remove the hex screw and locknut that secures the battery clamp to the negative battery terminal/post. Remove battery clamp.
- Remove the hex screw and locknut that secures the battery clamp to the positive battery terminal/post. Remove battery clamp.

**DETAIL "A" - DIRECT MOUNT METHOD****Terminal Cap Installation****DETAIL "B" - BATTERY CLAMP METHOD****Terminal Cover Installation****Terminal/Cable Connection****Terminal Cable Connection****FIGURE 3 - DISCONNECTING BATTERIES**

## CONNECTING BATTERY CABLES

### WARNING

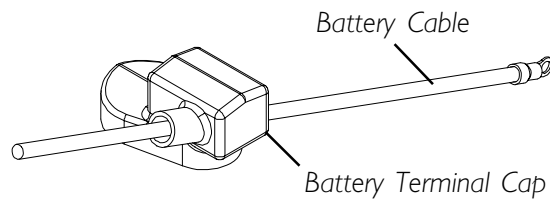
**NEVER** allow any of your tools and/or battery cable(s) to contact **BOTH** battery terminal(s)/post(s) at the same time. An electrical short may occur and serious personal injury or damage may occur.

The use of rubber gloves and chemical goggles is recommended when working with batteries.

Perform one (1) of the following methods for connecting the battery cable(s):

- A. **FOR 22 NF BATTERIES THAT HAVE MOUNTING HOLES IN THE BATTERY TERMINAL(S)/POST(S)** - Use direct mount method. Refer to FIGURES 4 AND 5.
- B. **FOR 22 NF BATTERIES THAT DO NOT HAVE MOUNTING HOLES IN THE BATTERY TERMINAL(S)/POST(S)** - Use battery clamp method. Refer to FIGURES 6, 7 AND 8.

### INSTALLING BATTERY TERMINAL CAPS



*NOTE: Only one (1) battery cable and terminal cap shown for clarity. Both caps install in the same manner.*

### DIRECT MOUNT METHOD (FIGURES 4 AND 5)

1. Install battery terminal cap(s) onto battery cable(s) as follows (FIGURE 3):
  - A. RED battery terminal cap onto RED battery cable.
  - B. BLACK battery terminal cap onto BLACK battery cable.

### FIGURE 4 - CONNECTING BATTERY CABLES - DIRECT MOUNT METHOD

### CAUTION

**When connecting the battery cables to the battery(ies), the battery cable(s) MUST be connected to the battery terminal(s)/post(s) as shown in FIGURE 5 and 6 (depending on battery type), otherwise damage to the battery cable may result when installing battery terminal caps.**

2. Connect battery cable(s) to battery(ies) terminal(s)/post(s) as follows (DETAIL "A" or DETAIL "B" of FIGURE 3, depending on battery type):
  - A. NEGATIVE (-) BLACK battery cable to NEGATIVE (-) battery terminal/post.
  - B. POSITIVE (+) RED battery cable to POSITIVE (+) battery terminal/post.
3. Secure the battery cable(s)/ring terminal(s) to the battery terminal(s)/post(s), BLACK to NEGATIVE (-) and RED to POSITIVE (+), with the provided 1/4-20 x 7/8-inch hex flange screw and hex flange locknut. Securely tighten. (DETAIL "A" or DETAIL "B" of FIGURE 3, depending on battery type).
4. Verify all battery cable(s)/ring terminal(s) are correctly installed and securely tightened.
5. Slide terminal cap(s) down battery cable(s) and onto battery clamps (FIGURE 3).

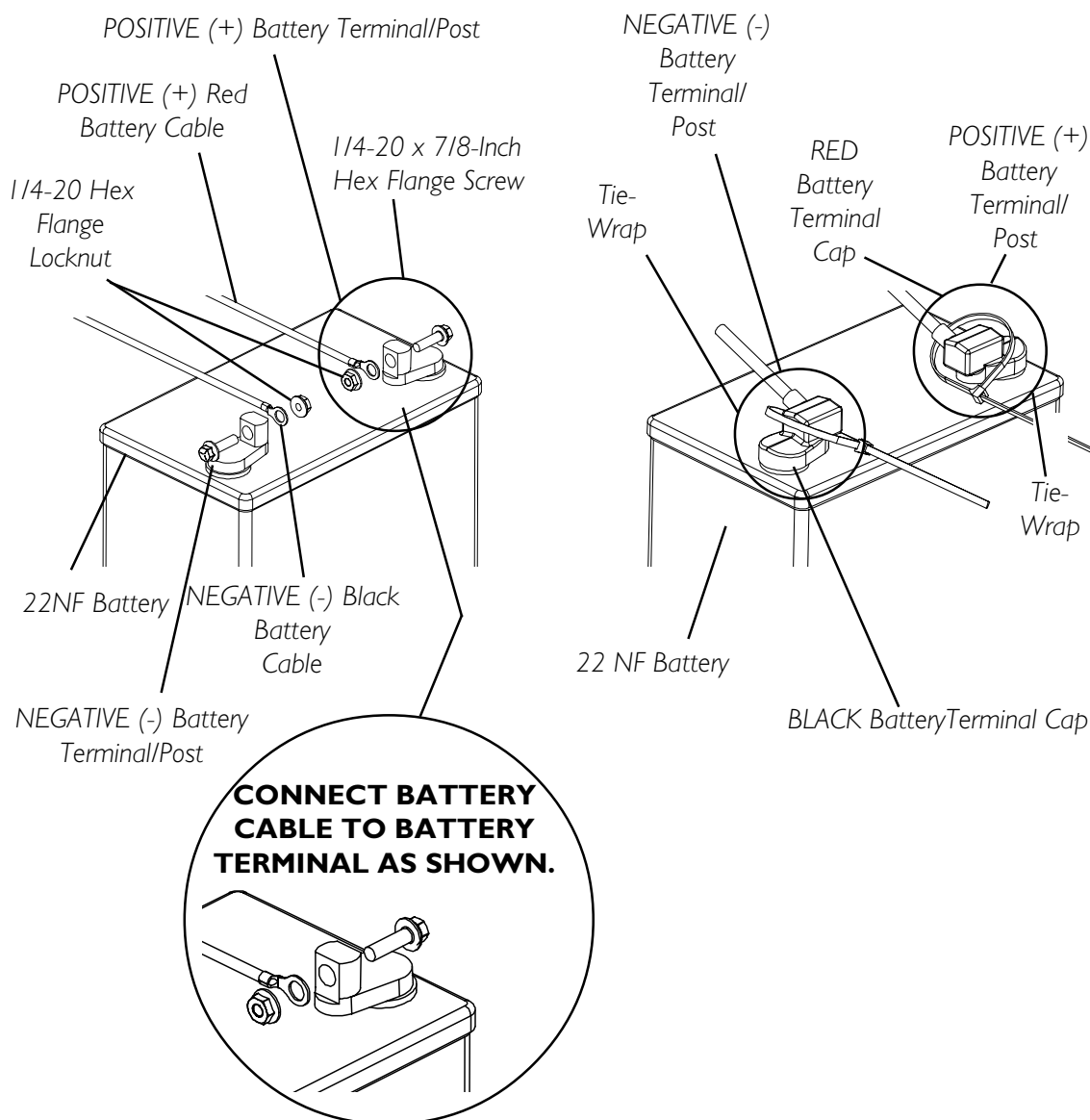
6. Secure each terminal cap in place with a tie-wrap (Use tie-wraps 11-1/2-inches long).

*NOTE: It will be necessary to trim excess tie-wrap in order to install the battery box top(s).*

7. Install the battery with lid into the wheelchair. Refer to INSTALLING/REMOVING BATTERIES in this procedure.

*NOTE: New battery(ies) MUST be fully charged BEFORE using, otherwise the life of the battery(ies) will be reduced.*

8. If necessary, charge the battery(ies). Refer to CHARGING BATTERIES in this procedure.



**FIGURE 5 - CONNECTING BATTERY CABLES - DIRECT MOUNT METHOD**

**BATTERY CLAMP METHOD (FIGURES 6, 7 AND 8).****CAUTION**

The battery clamps **MUST** be mounted in the positions shown in **FIGURE 6**, otherwise the battery box top cannot be installed properly.

1. Perform one (1) of the following:

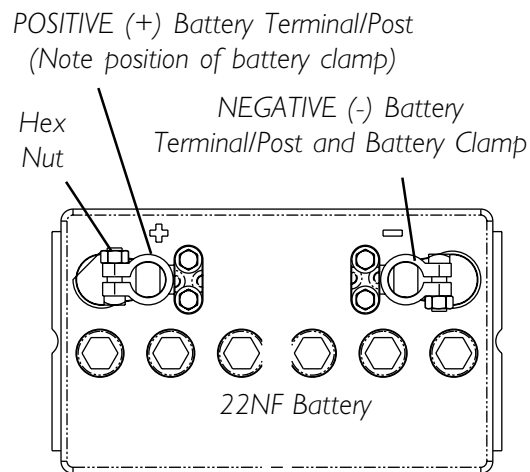
A. If the battery clamp of the POSITIVE (+) battery terminal/post is **NOT** mounted in the orientation shown in **FIGURE 5**, perform the following:

- Loosen the hex nut that secures the battery clamp to the POSITIVE (+) battery terminal/post.

**CAUTION**

**When tightening the clamps, always use a box wrench. Pliers will “round off” the nuts. NEVER wiggle the battery terminal(s)/post(s) when tightening. The battery may become damaged.**

- Remove the battery clamp from the POSITIVE (+) battery terminal/post.
- Reposition the battery clamp on the POSITIVE (+) battery terminal/post as shown in **FIGURE 6**.
- Securely tighten the hex nut that secures the battery clamp to the positive (+) battery terminal/post.



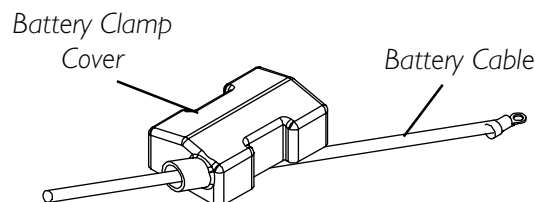
**FIGURE 6 - CONNECTING BATTERY CABLES - BATTERY CLAMP METHOD**

B. If the battery clamp on the POSITIVE (+) battery terminal/post is positioned as shown in **FIGURE 6**, proceed to **STEP 2**.

2. Install battery clamp covers onto battery cables as follows: (**FIGURE 7**)

- A. RED battery clamp cover onto RED battery cable.
- B. BLACK battery clamp cover onto BLACK battery cable.

**NOTE:** Only one (1) battery cable and battery clamp cover are shown for clarity. Both battery clamp covers install in the same manner.

**INSTALLING BATTERY CLAMP COVERS**

**FIGURE 7 - CONNECTING BATTERY CABLES - BATTERY CLAMP METHOD**

**CAUTION**

**When connecting the battery cable/ring terminal(s) to the battery(ies) clamp(s), the battery cable(s) **MUST** be connected in the position shown in **DETAIL “A”** of **FIGURE 8**, otherwise damage may occur to the battery cable and/or battery clamp covers.**

3. Connect battery cable(s) to battery(ies) terminal(s)/post(s) as follows (DETAIL “A”):
  - A. NEGATIVE (-) BLACK battery cable/ring terminal between the mounting plate and battery clamp of NEGATIVE (-) battery terminal/post.
  - B. POSITIVE (+) RED battery cable/ring terminal between the mounting plate and battery clamp of POSITIVE (+) battery terminal/post.
4. Secure the battery cable(s)/ring terminal(s) to the battery clamp(s), BLACK to NEGATIVE (-) and RED to POSITIVE (+), with existing hex screws. Securely Tighten. (DETAIL “A”)
5. Verify battery cable ring terminal(s) are correctly installed and securely tightened.
6. Slide battery clamp covers down battery cables and onto battery terminals. (DETAIL “B”)
7. Secure each terminal cap in place with a tie-wrap (Use tie-wraps 11-1/2-inches long). (DETAIL “B”)

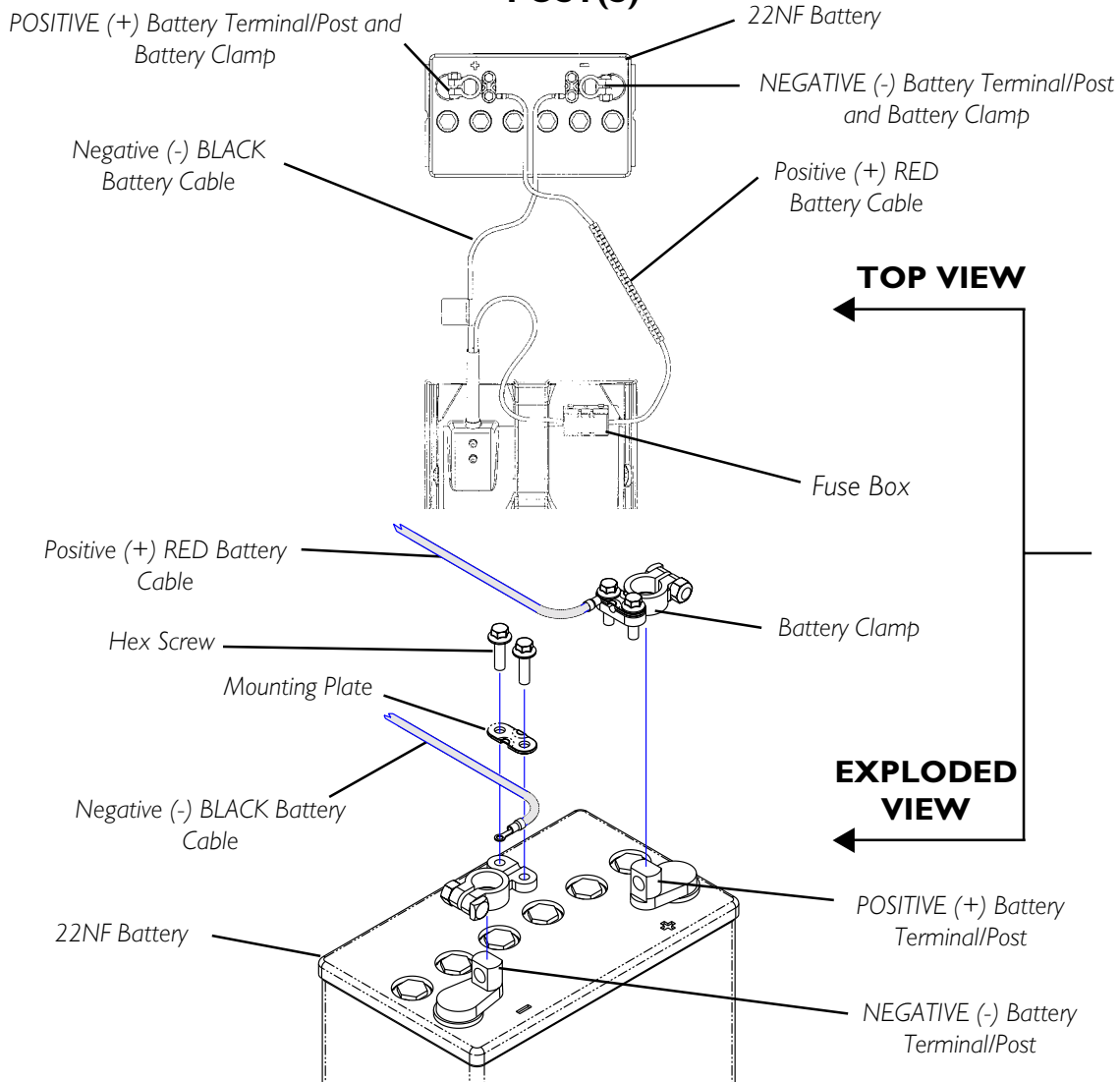
*NOTE: It will be necessary to trim excess tie-wrap in order to install the battery box top(s).*

8. Install the battery with lid into the wheelchair. Refer to INSTALLING/REMOVING BATTERIES in this section.

*NOTE: New battery(ies) **MUST** be fully charged **BEFORE** using, otherwise the life of the battery(ies) will be reduced.*

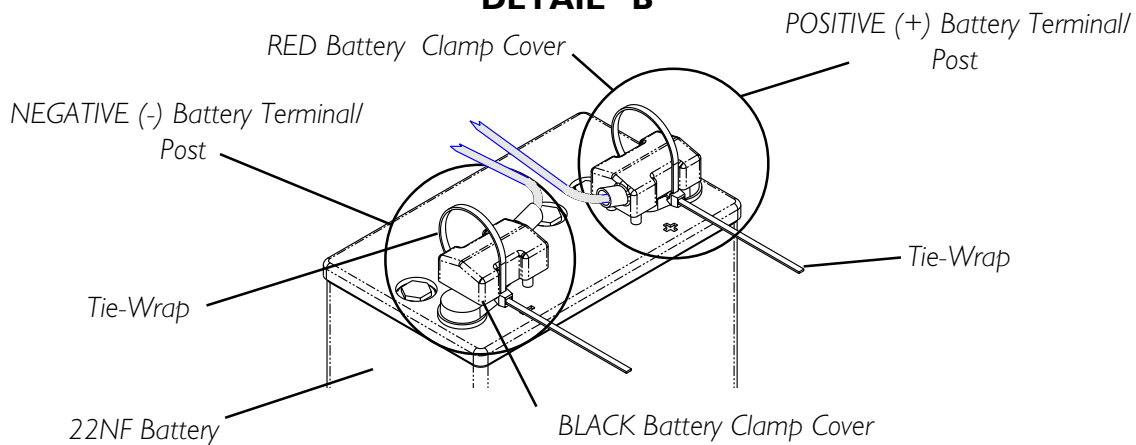
9. If necessary, charge the battery(ies). Refer to CHARGING BATTERIES in this procedure.

## CONNECTING BATTERY CABLE(S) TO BATTERY(IES) TERMINAL(S)/ POST(S)



**NOTE:** Battery clamps exploded away for clarification purposes only.

### DETAIL "B"



**FIGURE 8 - CONNECTING BATTERY CABLES - BATTERY CLAMP METHOD**

## WHEN TO CHARGE BATTERIES (FIGURE 9)

The Battery Discharge Indicator (BDI) is a bar graph display located on the MKIV joystick. It will keep you informed as to power availability. A visual warning is given before the power becomes too low to operate the wheelchair. At full charge the two (2) LEFT segments and the farthest RIGHT segment of the bar graph will be illuminated. As the battery becomes discharged, the farthest RIGHT segment will progressively move to the LEFT until only the last two (2) bars (LEFT) are illuminated. At this level the last two (2) bars (LEFT) will start to Flash ON and OFF to indicate that the end user should charge the batteries as soon as possible.

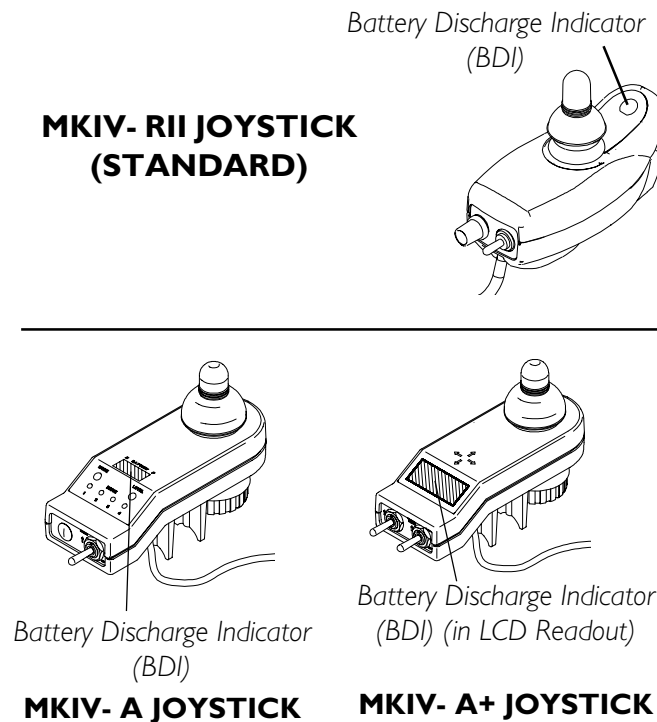


FIGURE 9 - WHEN TO CHARGE BATTERIES

## CHARGING BATTERIES (FIGURE 10)

*NOTE: New batteries MUST be fully charged prior to initial use of the wheelchair.*

### WARNING

**Never attempt to recharge the batteries by attaching cables directly to the battery terminals or clamps. Always use the recharging plug located on the back of the joystick or on the front shroud.**

**DO NOT attempt to recharge the batteries and operate the power wheelchair at the same time.**

**During use and charging, unsealed batteries will vent hydrogen gas which is explosive in the right concentration with air.**



**CAUTION**

**Always charge new batteries before initial use or battery life will be reduced.**

*NOTE: As a general rule, batteries should be recharged daily to assure the longest possible life and minimize the required charging time. Plan to recharge the batteries when it is anticipated the wheelchair will not be used for a long period of time.*

The range per battery charge using recommended batteries should be approximately 5 to 9 hours of typical operation. Extensive use on inclines may substantially reduce per charge mileage.

**DESCRIPTION AND USE OF BATTERY CHARGERS**

The charger automatically reduces the charge from an initially high rate to a zero reading at a fully charged condition. If left unattended, the charger should automatically shut-off when full charge is obtained.

**There are some basic concepts which will help you understand this automatic process. They are:**

The amount of electrical current drawn within a given time to charge a battery is called the “charge rate”. If, due to usage, the charge stored in the battery is low, the charge rate is high, as indicated by the green light on the charger. Initially, the green light will stay illuminated for a short period of time followed by a longer period of off time. As a charge builds up, the charge rate is reduced, and the green light will stay illuminated for a longer period of time followed by a shorter off time.

**WARNING**

**NEVER leave the charger unattended when the charger circuit breaker is tripping ON and OFF. A condition between the battery charger and batteries exists. Unplug immediately. Contact an Invacare dealer.**

*NOTE: If performing the charging procedures independently, READ and CAREFULLY follow the individual instructions for each charger (supplied or purchased).*

*NOTE: If charging instructions are not supplied, consult a qualified service technician for proper procedures.*

**REQUIRED ITEMS:**

TOOL	QUANTITY	COMMENTS
Battery Charger	1	Supplied
◆ Extension Cord	1	Not Supplied

◆ (3-prong plug, 15 ampere current rating, industrial type)

I. Perform one (1) of the following:

- A. **WHEELCHAIRS EQUIPPED WITH MKIV-A OR MKIV-A+ JOYSTICK** -  
Attach the battery charger connector to the charger cable/battery harness.

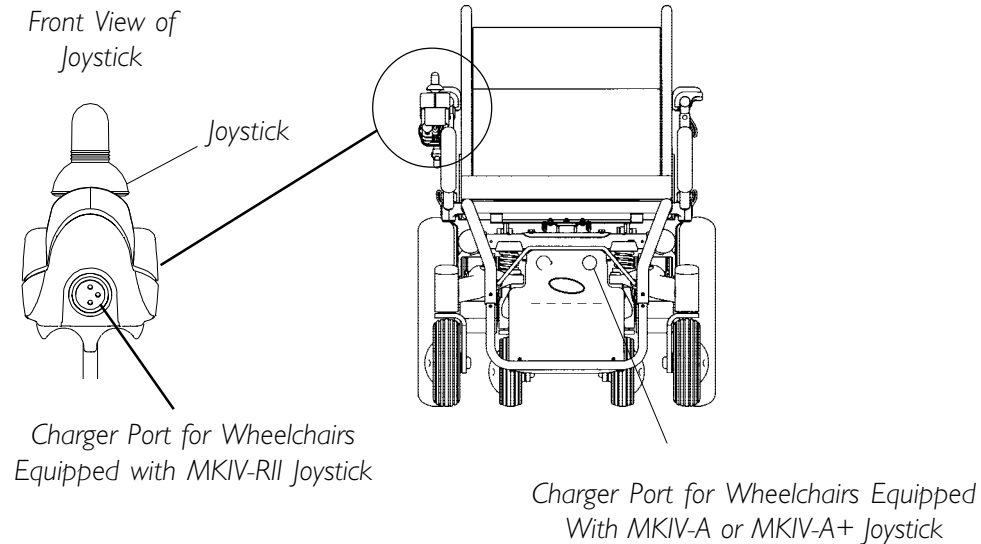
*NOTE: The battery charger connector is factory installed on the front shroud side of the wheelchair. I*

2. Plug the charger's AC power cord, or extension, into the grounded 120 VAC wall outlet.
3. Wait until charging is complete.

*NOTE: Allow eight (8) hours for normal charging. Larger batteries (greater than 55 ampere-hours) or severely discharged batteries may require up to sixteen (16) hours to be properly charged and equalized. If charger operates for sixteen (16) hours and is unable to fully charge the batteries, an internal timer turns the charger off and begins to fast blink the green light.*

*NOTE: It is advantageous to recharge frequently rather than only when necessary. In fact, a battery's life is extended if the charge level is maintained well above a low condition.*

*NOTE: If the batteries need to be charged more often or take longer to charge than normal, they may need to be replaced. Contact an Invacare dealer for service.*



**FIGURE 10 - CHARGING BATTERIES**

## CLEANING BATTERY TERMINALS

### WARNING

**Most batteries are not sold with instructions. However, warnings are frequently noted on the cell caps. Read them carefully.**

**DO NOT** allow the liquid in the battery to come in contact with skin, clothes or other possessions. It is a form of acid and harmful or damaging burns may result. Should the liquid touch your skin, wash the area **IMMEDIATELY** and thoroughly with cool water. In serious cases or if eye contact is made, seek medical attention **IMMEDIATELY**.

1. Examine battery clamps and terminals for corrosion.
2. Verify the plastic caps are in place over battery cell holes.
3. Clean terminals and inside battery clamps by using a battery cleaning tool, wire brush, or medium grade sand paper.

*NOTE: Upon completion, areas should be shiny, not dull.*

4. Carefully dust off all metal particles.

***This Procedure Includes the Following:***

***Installing/Removing MKIV-A Wiring Harness***  
***Installing/Removing MKIV-RII Wiring Harness***  
***Installing/Removing MKIV-A Joystick***  
***Installing/Removing MKIV-RII Joystick***

## **REMOVING/INSTALLING MKIV-A WIRING HARNESS (FIGURE 1)**

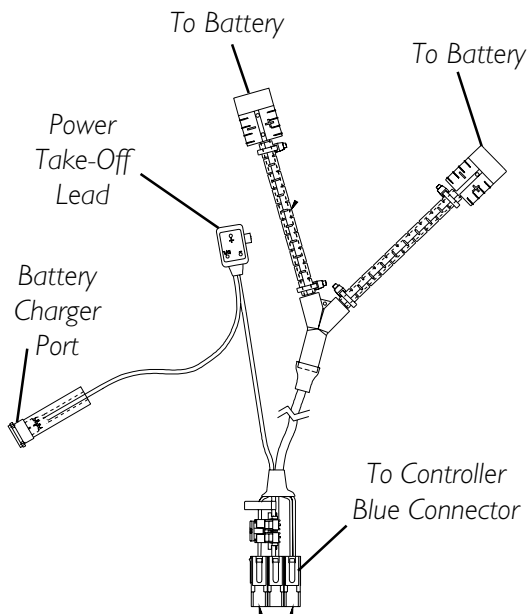
### **REMOVING**

1. Review DETAIL “A” in FIGURE 1 and identify each connector.
2. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
3. Remove the two (2) mounting screws and washers that secure the front shroud in place. Refer to DETAIL “B” in FIGURE 1.
4. Cut the tie-wrap that secures the power take-off lead in place (DETAIL “C” in FIGURE 1).
5. Disconnect the battery wiring harness blue connector from the controller blue connector (DETAIL “C” in FIGURE 1).
6. Disconnect the power take-off lead from the other optional power connectors (DETAIL “C” in FIGURE 1).
7. Remove the two (2) mounting screws that secure the battery charger port to the mounting bracket (DETAIL “C” in FIGURE 1).
8. Remove battery charger port from mounting bracket by pulling forward and feeding cable through cutout in mounting bracket (DETAIL “C” in FIGURE 1).
9. Remove battery wiring harness from base frame by feeding power-take-off lead, blue battery connector and battery charger port up through cutout in battery tray.

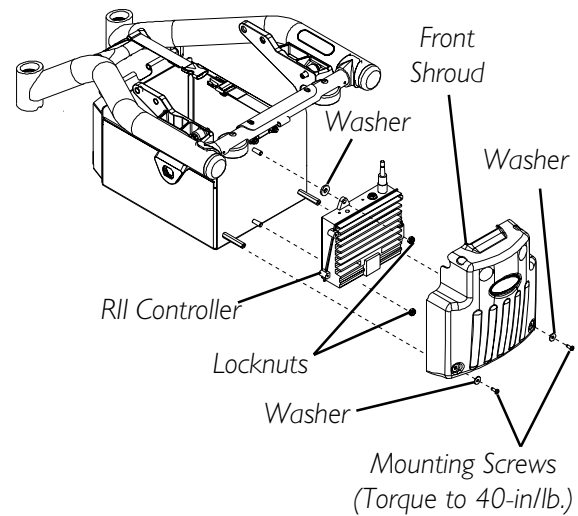
### **INSTALLING**

1. Install battery wiring harness into base frame by feeding power-take-off lead, blue battery connector and battery charger port down through cutout in battery tray (DETAIL “C” in FIGURE 1).
2. Position battery charger port into mounting bracket by feeding cable up through cutout and push backward (DETAIL “C” in FIGURE 1).
3. Secure the battery charger port to the mounting bracket with two (2) mounting screws (DETAIL “C” in FIGURE 1). Securely tighten.
4. Connect the power take-off lead to other optional power connectors, if necessary (DETAIL “C” in FIGURE 1).
5. Connect the battery wiring harness blue connector to the controller blue connector (DETAIL “C” in FIGURE 1).
6. Secure the power take-off lead in place with NEW tie-wrap (DETAIL “C” in FIGURE 1).
7. Secure the front shroud in place with two (2) NEW mounting screws and washers (DETAIL “B” in FIGURE 1).
8. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.

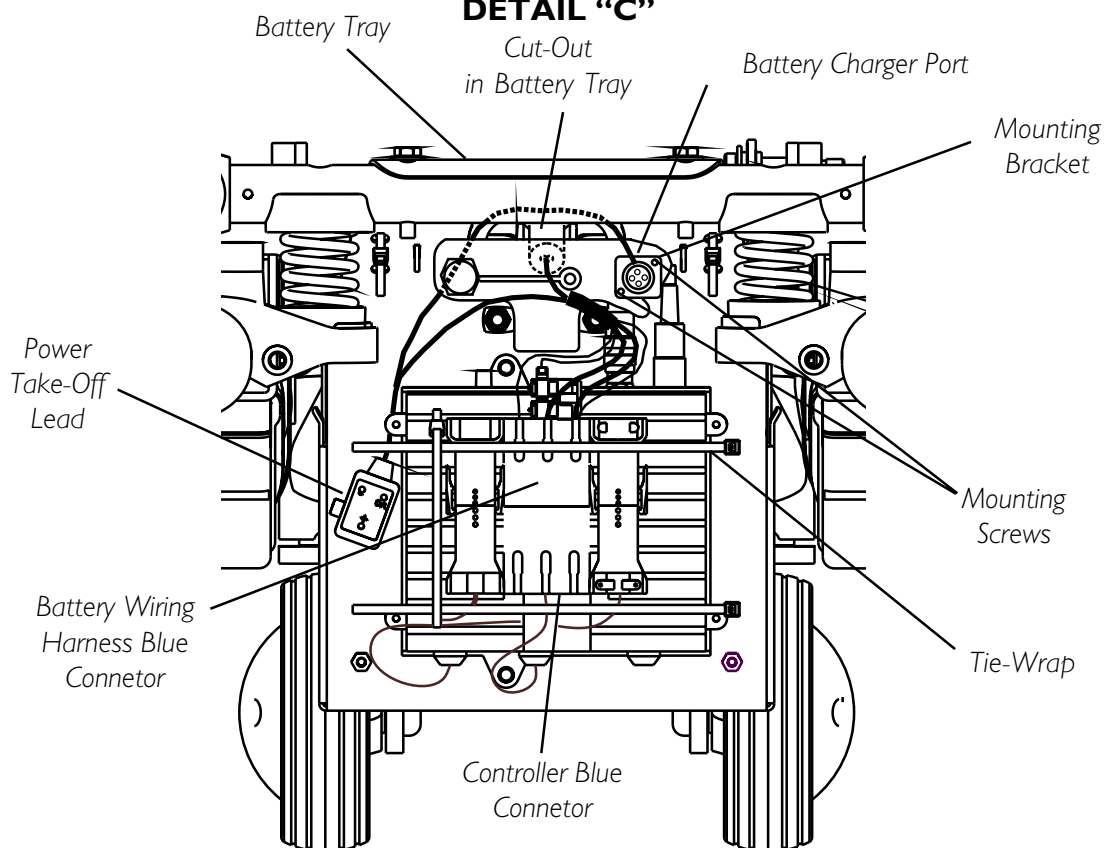
### DETAIL "A" - IDENTIFYING BATTERY WIRING HARNESS CONNECTORS



### DETAIL "B"



### DETAIL "C"



**FIGURE 1 - REMOVING INSTALLING THE MKIV WIRING HARNESS**

## REMOVING/INSTALLING THE MKIV-RII WIRING HARNESS (FIGURE 2)

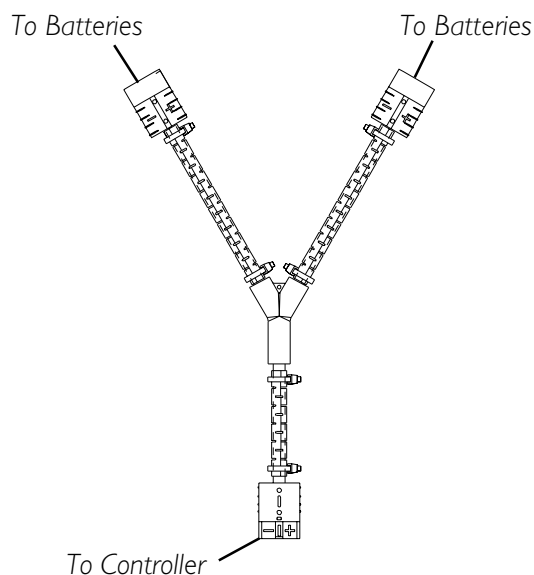
### REMOVING

1. Review DETAIL “A” in FIGURE 12 and identify each battery wiring harness connector.
2. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
3. Remove the two (2) mounting screws and washers that secure the front shroud in place. Refer to DETAIL “A” in FIGURE 2.
4. Disconnect the battery wiring harness connector from the controller connector.
5. Remove battery wiring harness from base frame by feeding the blue lead up through cutout in battery tray.

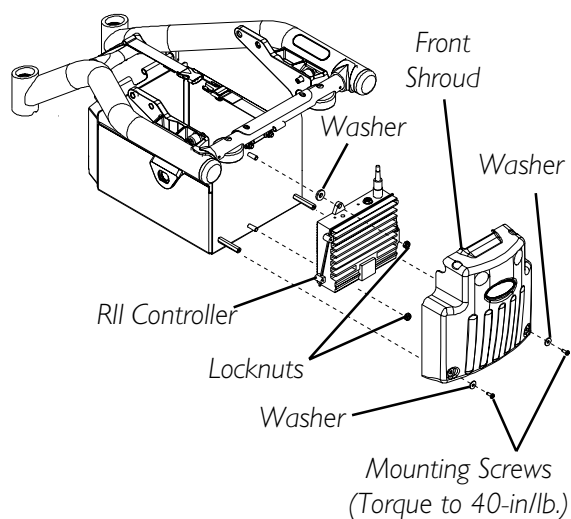
### INSTALLING

1. Install the battery wiring harness from base frame by feeding controller blue lead down through cutout in battery tray.
2. Connect the battery wiring harness connector to the controller connector.
3. Secure the front shroud in place with two (2) mounting screws and washers. Refer to DETAIL “A” in FIGURE 2. Torque mounting screws to 40-in./lbs..
4. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.

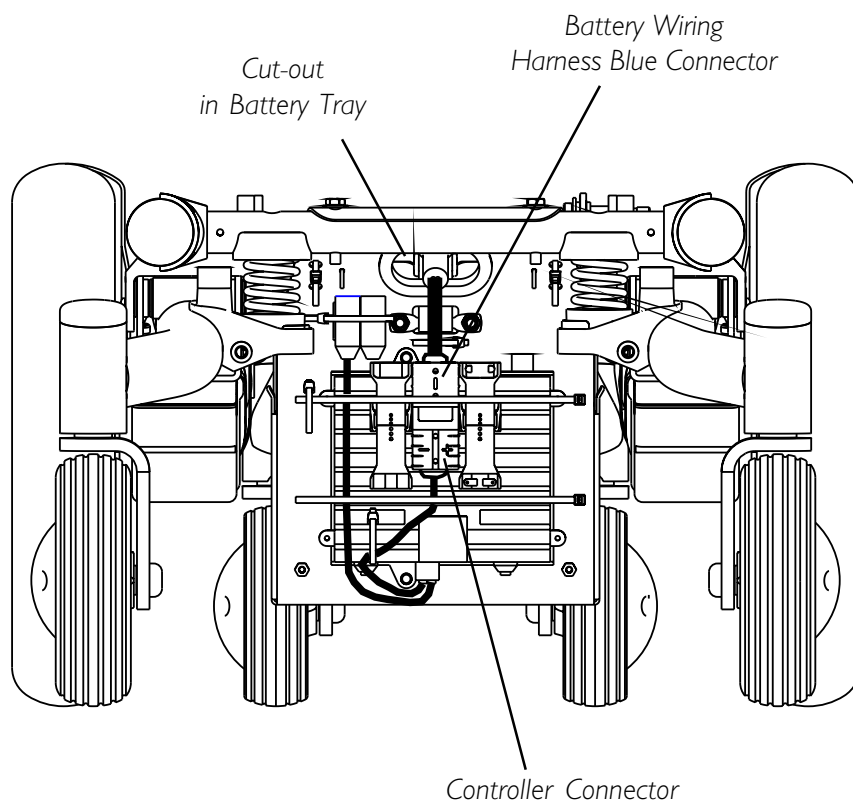
### DETAIL "A" - IDENTIFYING BATTERY WIRING HARNESS CONNECTORS



### DETAIL "B"



### DETAIL "C"



**FIGURE 2 - REMOVING INSTALLING THE MKIV WIRING HARNESS**

## REMOVING/INSTALLING THE MKIV-A JOYSTICK

*NOTE: The instructions outlined below are for the removal/installation of the MKIV-A joystick on an ASBA seat. For additional views of other MKIV mounting options see FIGURE 3.*

### REMOVING (FIGURE 4)

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUD in SECTION 7 of this manual.
3. Disconnect the joystick connector from the controller (DETAIL “A”).
4. Disconnect the right motor lead from the right controller connector (DETAIL “A”).

*NOTE: There is a section of joystick cable and right motor lead that is covered with a wire harness wrap.*

5. Cut tie-wrap that secure the wire harness wrap to the battery tray (DETAIL “A”).
6. Press wire harness wrap down in between suspension arm, battery box, and controller (DETAIL “B”).
7. Feed joystick cable and right motor lead up through the base frame in-between the suspension arm and battery box (DETAIL “B”).
8. Cut the tie-wraps that secures the wire harness wrap to the joystick/motor cable (DETAIL “B”).
9. Cut the two (2) tie-wraps that secure the joystick cable to the joystick tube (DETAIL “C”).
10. Cut the remaining three (3) tie-wraps that secure the joystick cable to the armrest and seat frame (DETAIL “C”).
11. Rotate adjustment lock lever and remove joystick tube from mounting bracket (DETAIL “C”).
12. Pull the joystick and mounting tube with cable from the wheelchair (DETAIL “C”).

### INSTALLING (FIGURE 4)

1. Install joystick tube into mounting bracket (DETAIL “C”).
2. Feed the joystick cable through the back of the chair underneath the seat frame.
3. Route joystick cable as shown in (DETAIL “C”).
4. Secure the joystick cable with tie-wraps as shown in (DETAIL “C”).
5. Join joystick cable and motor lead together with tie wraps. The joystick cable must extend approximately 5-1/2-inches beyond end of motor lead in order to connect to the controller (DETAIL “B”).
6. Position wire harness wrap around joystick cable/motor cable lead leaving approximately 6-inches from end of motor lead (DETAIL “B”).
7. Secure the wire harness wrap in place with one tie-wrap on each end (DETAIL “B”).
8. Feed joystick cable and right motor lead down through the base frame in-between the suspension arm and battery box (DETAIL “B”).

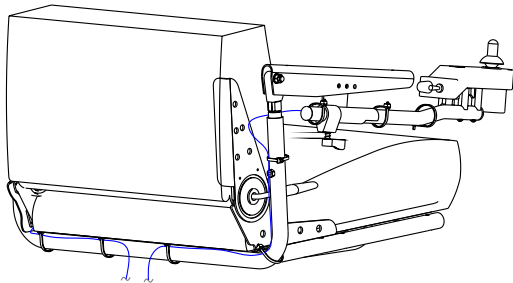
9. Cables are to be routed between battery box and compression spring. This can be accomplished by lifting wire harness wrap up in between suspension arm, battery box, and controller (DETAIL “B”).

*NOTE: Wire harness wrap to be secured against battery tray with tie-wrap so as to provide clearance between wire harness wrap and compression springs.*

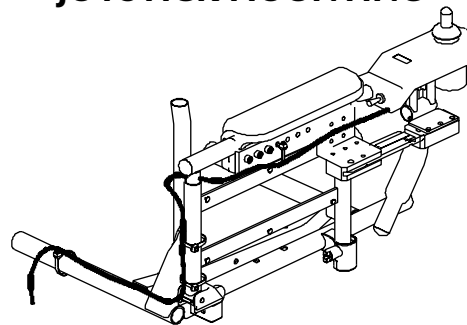
10. Secure wire harness wrap to battery tray with tie-wrap (DETAIL “B”).
11. Connect the right motor lead from the right controller connector (DETAIL “A”).
12. Connect the joystick connector from the controller (DETAIL “A”).
13. Install the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUD in SECTION 7 of this manual (DETAIL “A”).
14. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual (DETAIL “A”).

*NOTE: The tie-wrap locations beyond what is shown in the illustrations below are identical to the ones described in the instructions on the previous page.*

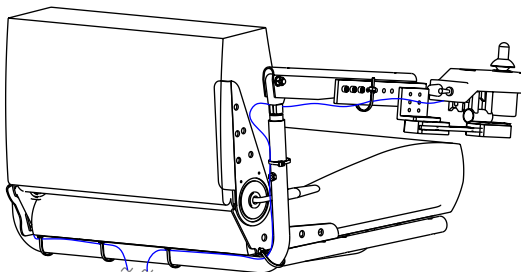
### VAN SEAT



### ASBA SEAT WITH QUAD LINK JOYSTICK MOUNTING

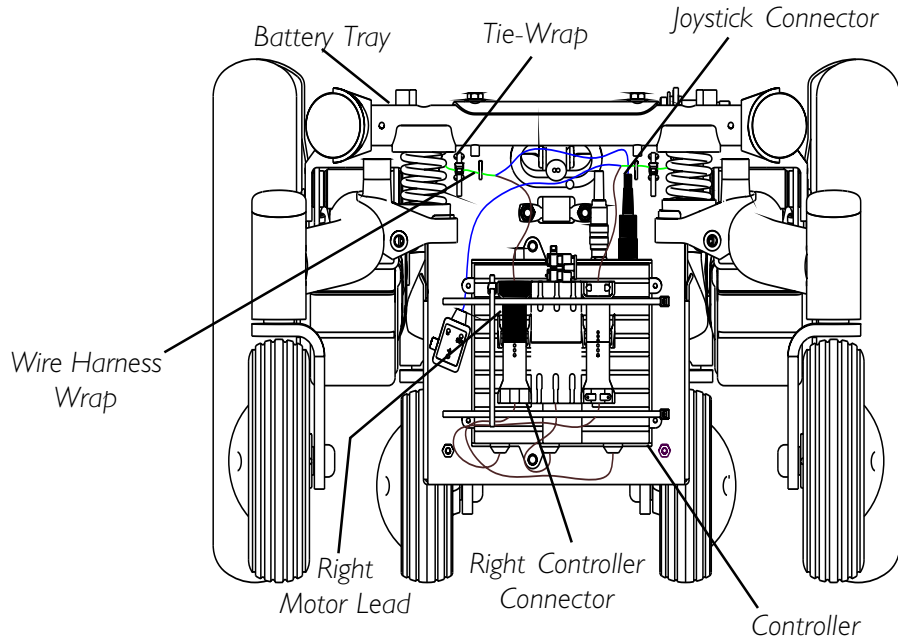
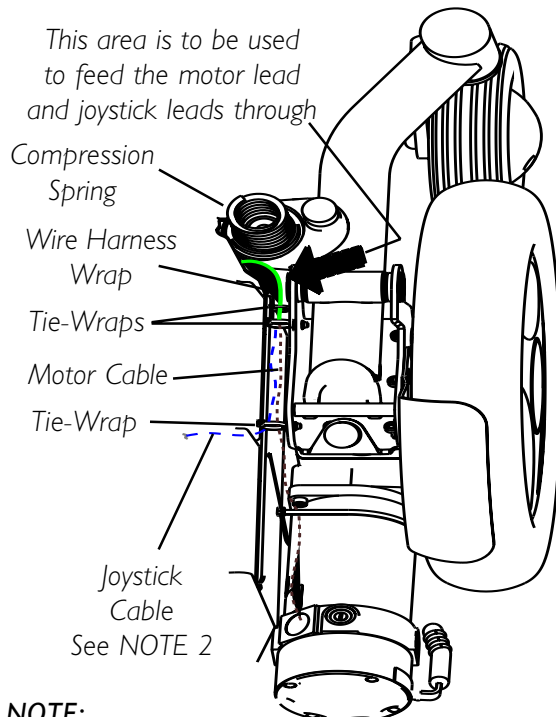


### VAN SEAT WITH QUAD LINK JOYSTICK MOUNTING

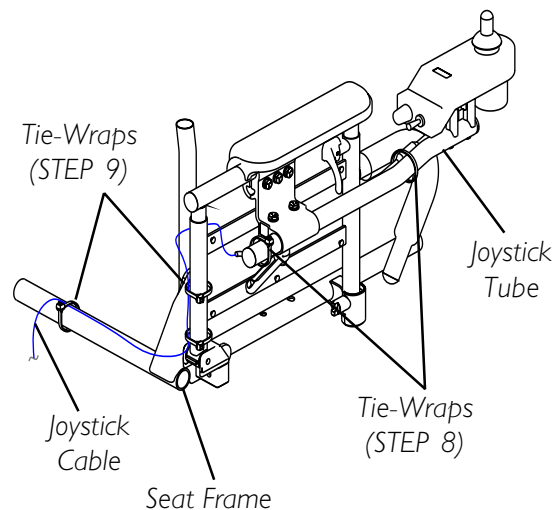


**FIGURE 3 - TIE-WRAP LOCATIONS FOR OTHER MKIV JOYSTICK MOUNTING OPTIONS**



**DETAIL "A" - FRONT VIEW****DETAIL "B" - TOP VIEW OF RIGHT SIDE OF CHAIR****NOTE:**

1. The seat is removed for clarity.
2. The portion of joystick cable located between rear tie-wrap on motor mount plate and central tie-wrap on rear seat frame tube **MUST** have enough slack in it so as to allow full up and down travel of motor during chair operation.

**DETAIL "C"**

**FIGURE 4 - REMOVING/INSTALLING MKIV-A OR MKIV-A+ JOYSTICKS - ASBA SEAT**

## REMOVING/INSTALLING THE MKIV-RII JOYSTICK (FIGURES 5 AND 6)

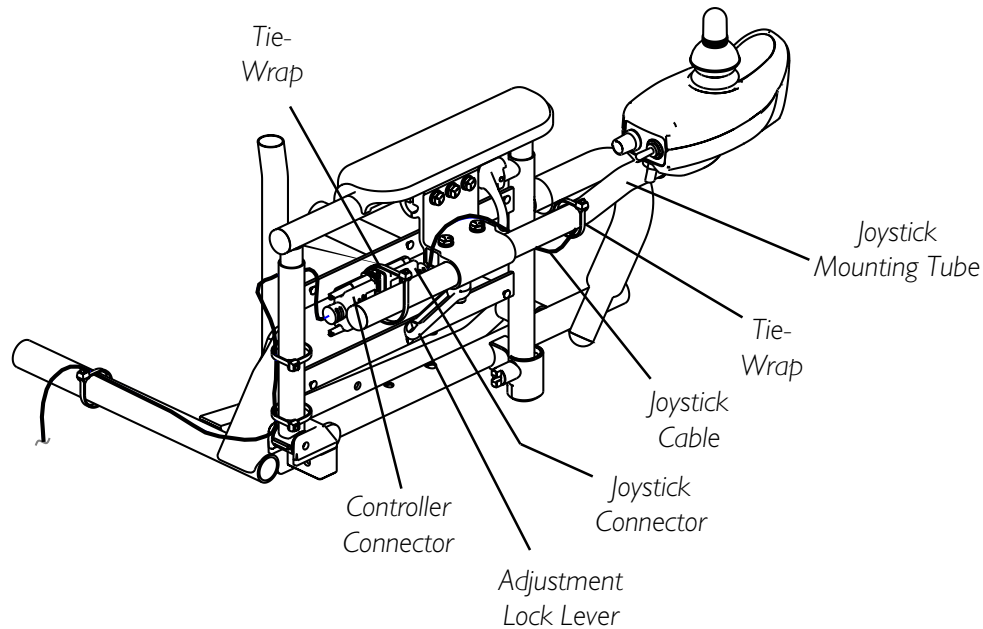
*NOTE: The instructions outlined below are for the removal/installation of the MKIV-RII joystick with offset mounting tube on an ASBA seat. For additional views of other mkiv-RII joystick mounting options see FIGURE 7.*

### REMOVING

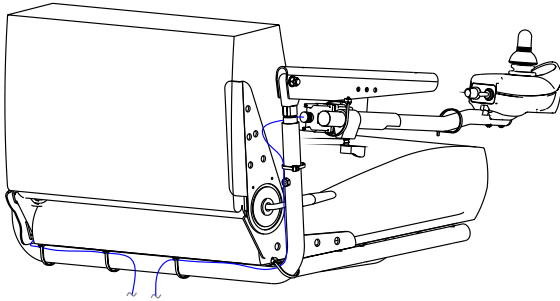
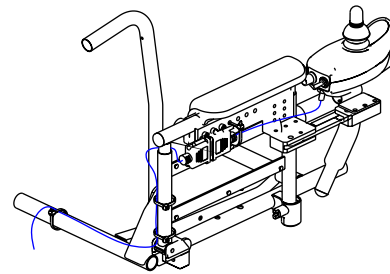
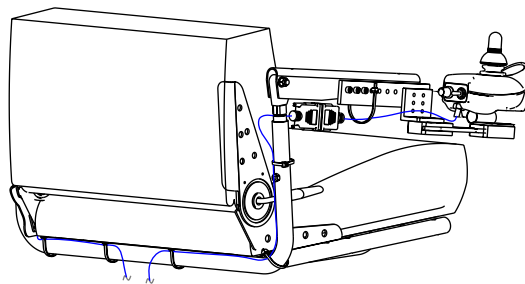
1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Cut tie-wrap that secures the joystick/controller connection to the joystick mounting tube.
3. Disconnect the joystick connector from the controller connector.
4. Cut the tie-wrap that secures the joystick cable to the joystick mounting tube.
5. Rotate adjustment lock lever and remove joystick mounting tube from mounting bracket.
6. Remove joystick from wheelchair.

### INSTALLING

1. Install joystick mounting tube into mounting bracket at the desired position.
2. Secure joystick mounting tube in place by rotating adjustment lock lever.
3. Plug joystick connector into controller connector. Secure connection by tightening screws on the side of controller connector.
4. Secure the joystick cable to joystick mounting tube with one (1) tie-wrap.
5. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.



**FIGURE 5 - REMOVING/INSTALLING THE MKIV-RII JOYSTICK**

**VAN SEAT****ASBA SEAT WITH QUAD LINK  
JOYSTICK MOUNTING****VAN SEAT WITH QUAD LINK JOYSTICK MOUNTING**

**FIGURE 6 - TIE-WRAP LOCATIONS FOR OTHER MKIV-R11 JOYSTICK  
MOUNTING OPTIONS**

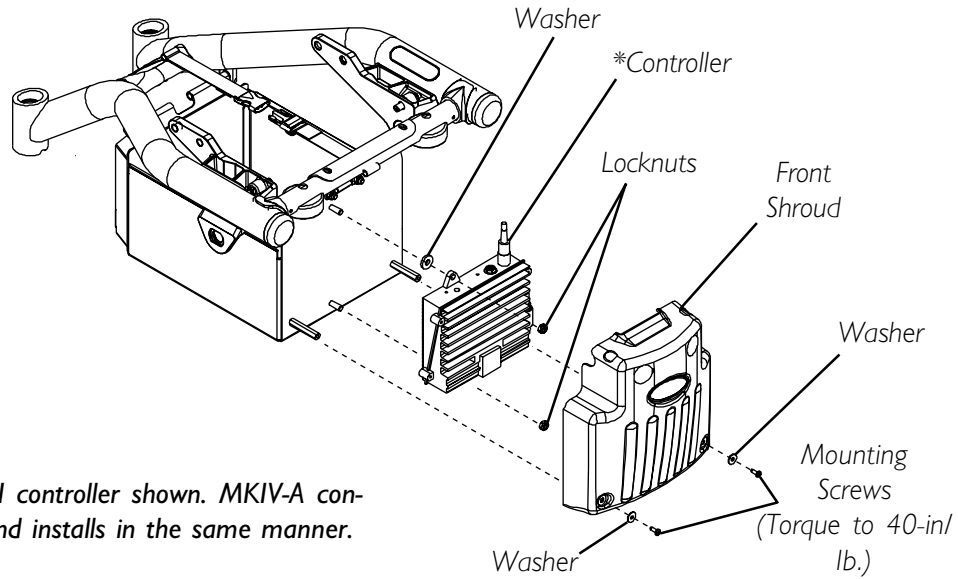
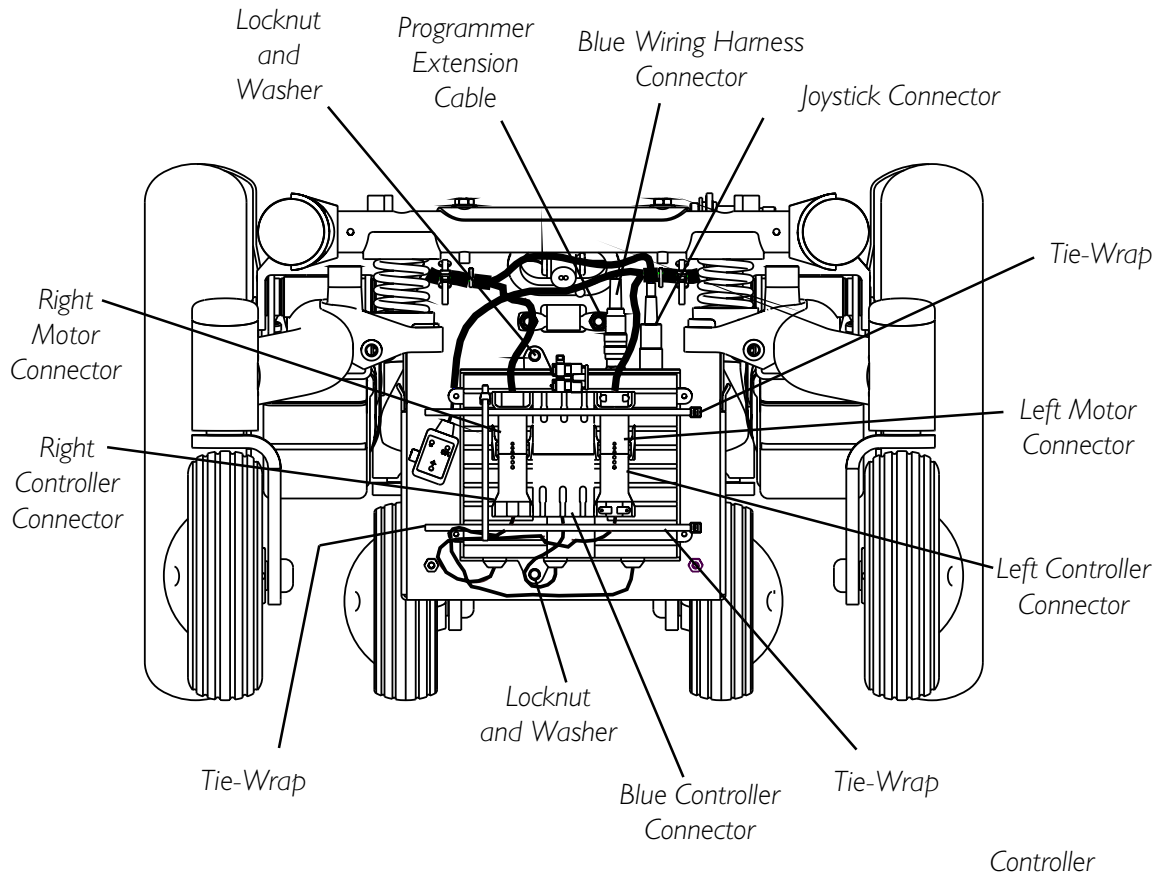
## REMOVING/INSTALLING THE MKIV-A CONTROLLER (FIGURE 7)

### REMOVING

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the two (2) mounting screws and washers that secure the front shroud in place. Refer to DETAIL “A” in FIGURE 8.
3. Cut the three (3) tie-wraps that secure controller cables up against the controller. Refer to DETAIL “B” in FIGURE 8.
4. Disconnect the right motor connector from the right controller connector. Refer to DETAIL “B” in FIGURE 8.
5. Disconnect the left motor connector from the left controller connector. Refer to DETAIL “B” in FIGURE 8.
6. Disconnect the blue controller connector from the blue wiring harness connector. Refer to DETAIL “B” in FIGURE 8.
7. Disconnect the joystick connector from the controller. Refer to DETAIL “B” in FIGURE 8.
8. Disconnect the programmer extension cable from the controller. Refer to DETAIL “B” in FIGURE 8.
9. Remove the two (2) washers and locknuts that secure the MKIV-A controller to the battery tray. Refer to DETAILS “A” and “B” in FIGURE 8.
10. Remove the MKIV-A controller from the front of the battery tray.

### INSTALLING

1. Position MKIV-A controller on front of battery tray as shown in DETAIL “A” in FIGURE 8.
2. Secure MKIV-A controller to front of battery tray as shown in DETAIL “A” in FIGURE 8 with two (2) mounting screws and one (1) washer. Torque locknuts to 75-in/lb.
3. Connect the programmer extension cable to the controller. Refer to DETAIL “B” in FIGURE 8.
4. Connect the joystick connector to the controller. Refer to DETAIL “B” in FIGURE 8.
5. Connect the blue controller connector to the blue wiring harness connector. Refer to DETAIL “B” in FIGURE 8.
6. Connect the left motor connector to the left controller connector. Refer to DETAIL “B” in FIGURE 8.
7. Connect the right motor connector to the right controller connector. Refer to DETAIL “B” in FIGURE 8.
8. Secure the cables to the controller as shown in DETAIL “B” in FIGURE 8.
9. Secure the front shroud in place with two (2) mounting screws and washers. Torque mounting screws to 40-in/lb.

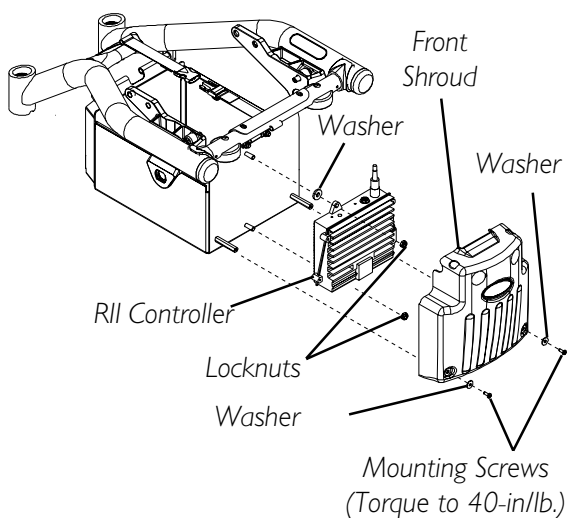
**DETAIL "A"****DETAIL "B"****FRONT VIEW****FIGURE 7 - REMOVING/INSTALLING THE MKIV-A CONTROLLER**

## REMOVING/INSTALLING THE MKIV-RII CONTROLLER

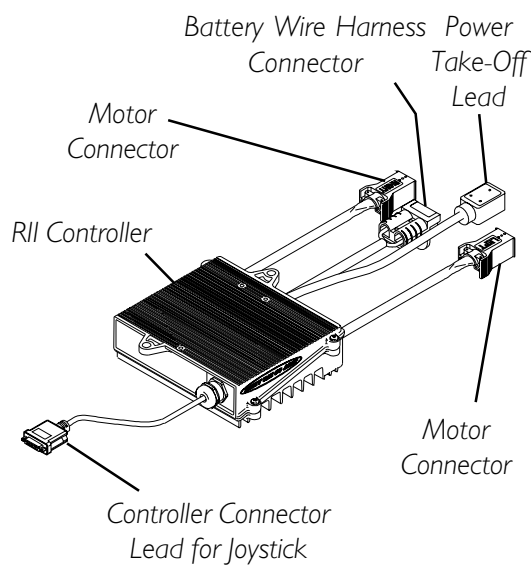
### REMOVING (FIGURES 8 AND 9)

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the two (2) mounting screws and washers that secure the front shroud in place. Refer to DETAIL “A” in FIGURE 9.
3. To help in removing the controller, review DETAIL “B” in FIGURE 9 and identify each lead and connector.
4. Disconnect joystick connector from the controller connector (DETAIL “C” in FIGURE 9).
5. Cut the tie-wrap that secures the controller/joystick connection to the joystick mounting tube (Detail “C” in FIGURE 9).
6. Cut the three (3) tie-wraps that secure the controller cable to the arm tube and seat frame (DETAIL “C” in FIGURE 9).
7. Cut the two (2) tie-wraps that secure the wire harness wrap around the controller cable and motor cable (Detail “C” in FIGURE 9)).
8. Cut all tie-wraps that secure the controller connector cable and motor cable together (DETAIL “D” in FIGURE 9).
9. Pull controller connector through base frame (DETAIL “D” in FIGURE 9).
10. Cut the four (4) tie-wraps that secure controller cables up against the controller (DETAIL “A” in FIGURE 10).
11. Disconnect the right motor connector from the right controller connector (DETAIL “A” in FIGURE 10).
12. Disconnect the left motor connector from the left controller connector (DETAIL “A” in FIGURE 10).
13. Disconnect the controller connector from the wiring harness connector (DETAIL “B” in FIGURE 10).
14. Cut the tie wrap that secures the power take-off lead in place (DETAIL “B” in FIGURE 10).
15. Disconnect the power take-off lead from any of the other powered accessory connectors (DETAIL “B” in FIGURE 10).
16. Remove the two (2) washers and locknuts that secure the MKIV-RII controller to the battery tray (DETAIL “A” in FIGURE 9).
17. Remove the MKIV-RII controller from the front of the battery tray (DETAIL “A” in FIGURE 9).

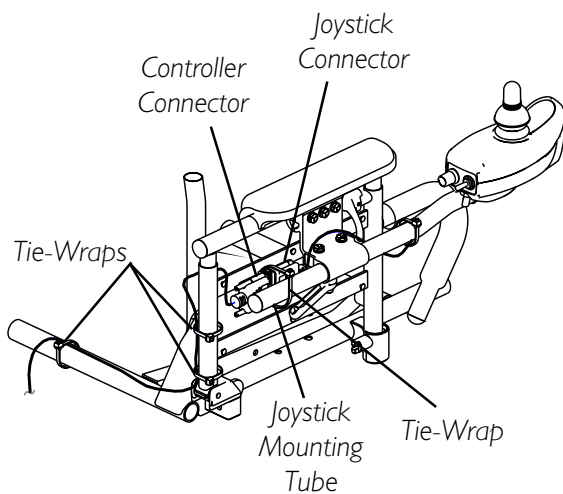
## DETAIL "A"



## DETAIL "B" - IDENTIFYING MKIV-RII CONTROLLER CONNECTORS



## DETAIL "C"

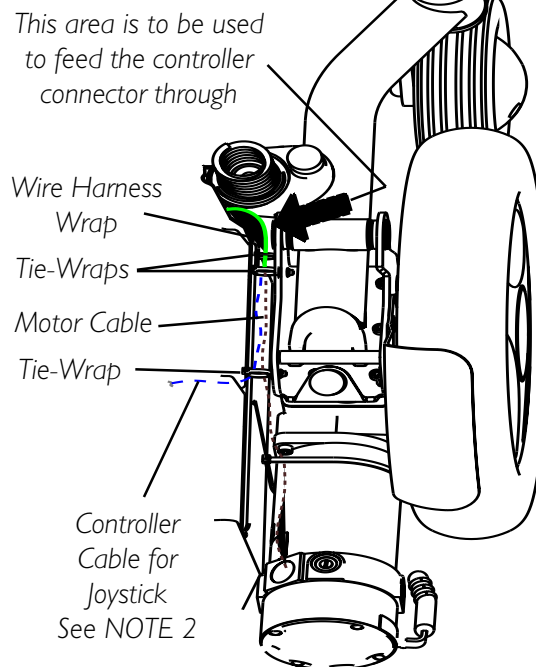


## NOTE:

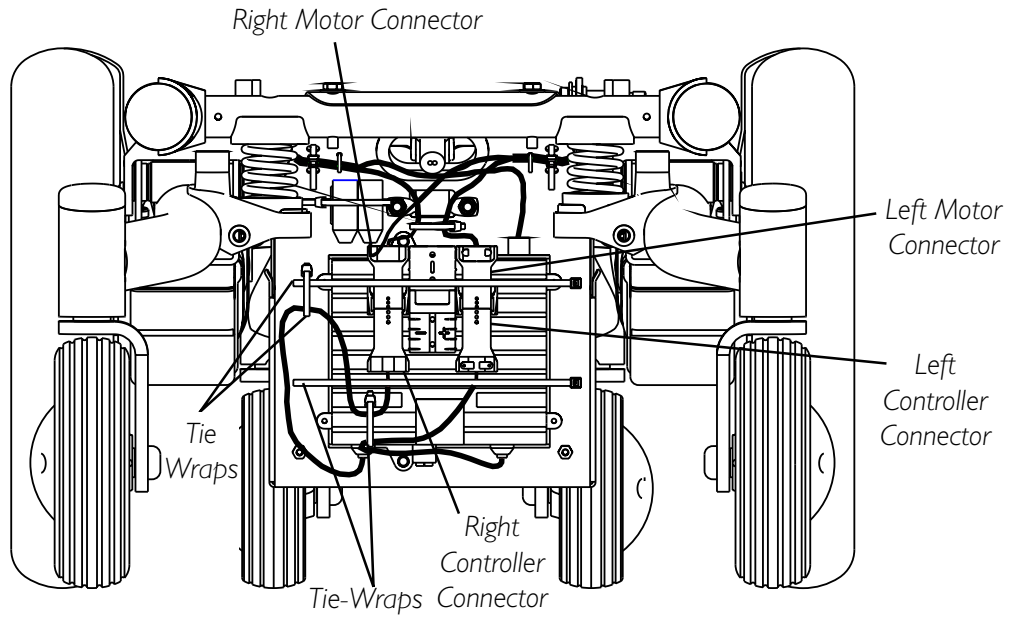
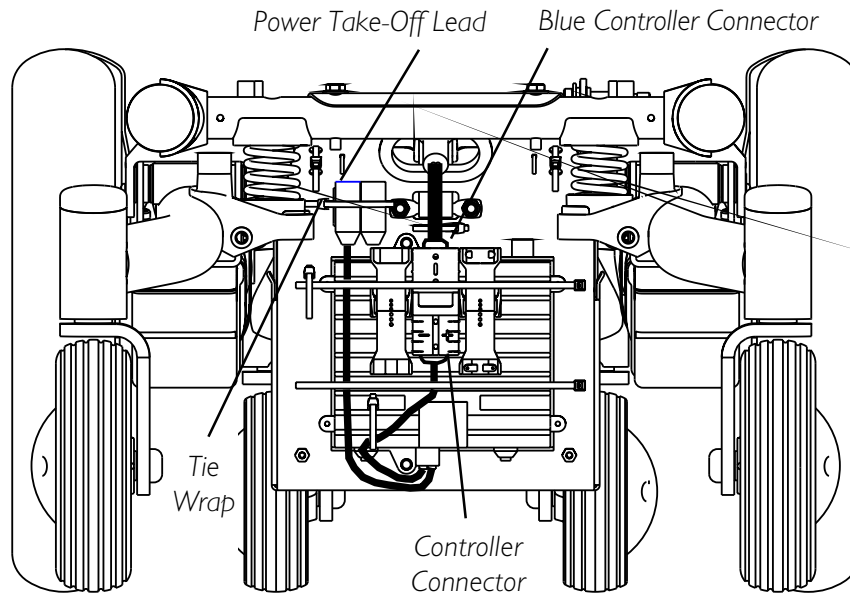
1. The seat is removed for clarity.
2. The portion of controller cable located between rear tie-wrap on motor mount plate and central tie-wrap on rear seat frame tube **MUST** have enough slack in it so as to allow full up and down travel of motor during chair operation.

## DETAIL "D"

NOTE: View is top right side of chair.



**FIGURE 8 - REMOVING/INSTALLING MKIV-RII CONTROLLER**

**DETAIL "A"****DETAIL "B"****FIGURE 9 - REMOVING/INSTALLING THE MKIV-RII CONTROLLER**



**INSTALLING**

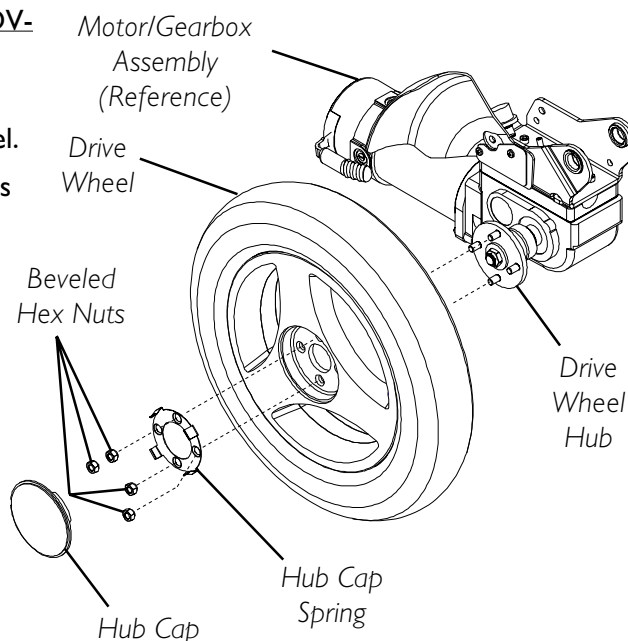
1. Position the MKIV-RII controller on the front of the battery tray as shown in DETAIL “A” in FIGURE 9.
2. Secure the MKIV-RII controller to the battery tray with the two (2) washers and lock-nuts (Detail “A” in FIGURE 9).
3. Connect the power take-off lead to the other powered accessory connectors, if necessary (DETAIL “B” in FIGURE 10).
4. Secure the power take-off lead in place with NEW tie wrap (DETAIL “B” in FIGURE 10).
5. Connect the controller connector to the wiring harness connector (Detail “B” in FIGURE 10).
6. Connect the left motor connector to the left controller connector (DETAIL “A” in FIGURE 10).
7. Connect the right motor connector to the right controller connector (DETAIL “A” in FIGURE 10).
8. Secure controller cables up against the controller with four (4) NEW tie-wraps (DETAIL “A” in FIGURE 10).
9. Feed controller connector (for joystick) down through base frame (DETAIL “D” in FIGURE 9).
10. Secure the controller connector cable (for joystick) and motor cable together (DETAIL “D” in FIGURE 9).
11. Secure the wire harness wrap around the controller connector cable (for joystick) and motor cable (DETAIL “D” in FIGURE 9).
12. Secure the controller connector cable (for joystick) to the arm tube and seat frame (DETAIL “C” in FIGURE 9).
13. Secure the controller/joystick connection to the joystick mounting tube (DETAIL “C” in FIGURE 9).
14. Connect joystick connector to the controller connector (DETAIL “C” in FIGURE 9).
15. Secure the front shroud in place with the two (2) mounting screws and washers (DETAIL “A” in FIGURE 9). Torque to 40-in./lbs..
16. Install the batteries. Refer to REMOVING/INSTALLING THE BATTERIES in SECTION 8 of this manual.

***This Procedure Includes the Following:******Removing/Installing Drive Wheel******Removing/Installing Drive Wheel Hub******Removing/Installing Motor******Removing/Installing Motor/Gearbox, Suspension Arm Assembly, Suspension Spring Hardware******Removing/Installing Casters*****REMOVING/INSTALLING DRIVE WHEEL (FIGURE 1)****REMOVING**

1. Remove the batteries. Refer to **REMOVING/INSTALLING BATTERIES** in SECTION 8 in this manual.
2. Remove the hub cap from drive wheel.
3. Remove the four (4) beveled hex nuts that secure the hub cap spring and drive wheel to the drive wheel hub.

**INSTALLING**

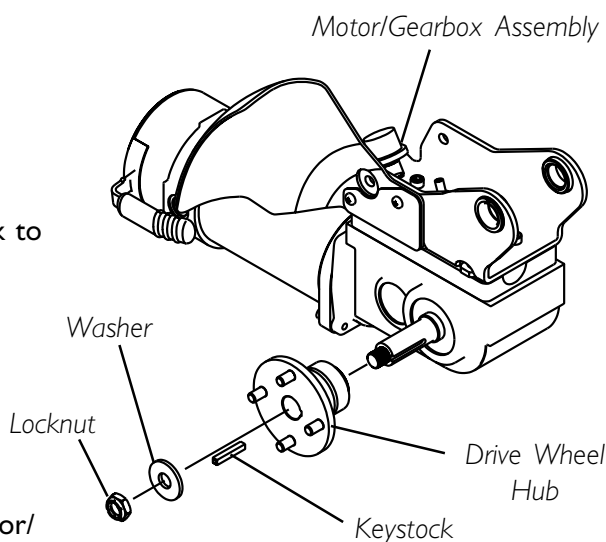
1. Secure the drive wheel and hub cap spring to the drive wheel hub with the four (4) beveled hex nuts. Torque to 13 ft/lbs.
2. Install the hub cap.
3. Install the batteries. Refer to **REMOVING/INSTALLING BATTERIES** in SECTION 8 in this manual.

**FIGURE 1 - REMOVING/INSTALLING THE DRIVE WHEEL****REMOVING/INSTALLING DRIVE WHEEL HUB (FIGURE 2)****REMOVING**

1. Remove the locknut that secures the drive wheel hub, washer, and keystock to the motor/gearbox assembly.
2. Remove the drive wheel hub.

**INSTALLING**

1. Install the drive wheel hub onto the motor/gearbox assembly.
2. Secure the drive wheel hub to the motor/gearbox assembly with locknut, washer and keystock as shown in FIGURE 2. Torque locknut to 45 ft/lbs.

**FIGURE 2 - REMOVING/INSTALLING DRIVE WHEEL HUB**

## REMOVING/INSTALLING MOTOR (FIGURE 3)

### REMOVING

1. If necessary, the seat and/or the drive wheels can be removed to make this procedure easier. Refer to REMOVING/INSTALLING DRIVE WHEEL in this section or REMOVING/INSTALLING SEAT FRAME in SECTION 6 of this manual.
2. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
3. Remove the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUDS in SECTION 7 of this manual.

*NOTE: The number of cable ties and their locations outlined below is one example of how to properly tie-wrap the cables for the LEFT motor. The number and locations of tie-wraps may vary from the LEFT to RIGHT motor assembly as well as from model to model. When removing tie-wraps their location MUST be noted for proper reinstallation of new tie-wraps.*

4. Cut the tie wraps that secure the motor cable to the motor.
5. Cut the tie-wrap that secures the motor cable and sensor cable to the motor mount.
6. Cut the tie-wrap that secures the wire harness wrap to the battery tray.
7. Cut the tie-wrap that secures the motor cable and sensor cable together.
8. Cut the two (2) tie-wraps that secure the wire harness wrap around the motor/sensor cable.
9. Disconnect the motor connector from the controller connector and the sensor cable from the power take-off lead.

*NOTE: There may be some tie-wraps that need to be cut before disconnecting. Note location of tie-wraps for proper reinstallation.*

10. Feed motor/sensor cable up through base frame.
11. Remove the wire harness wrap from around the motor/sensor cables.
12. Remove the two (2) allen screws and washers that secure the motor to the gearbox.
13. Carefully pull the motor away from the gearbox.

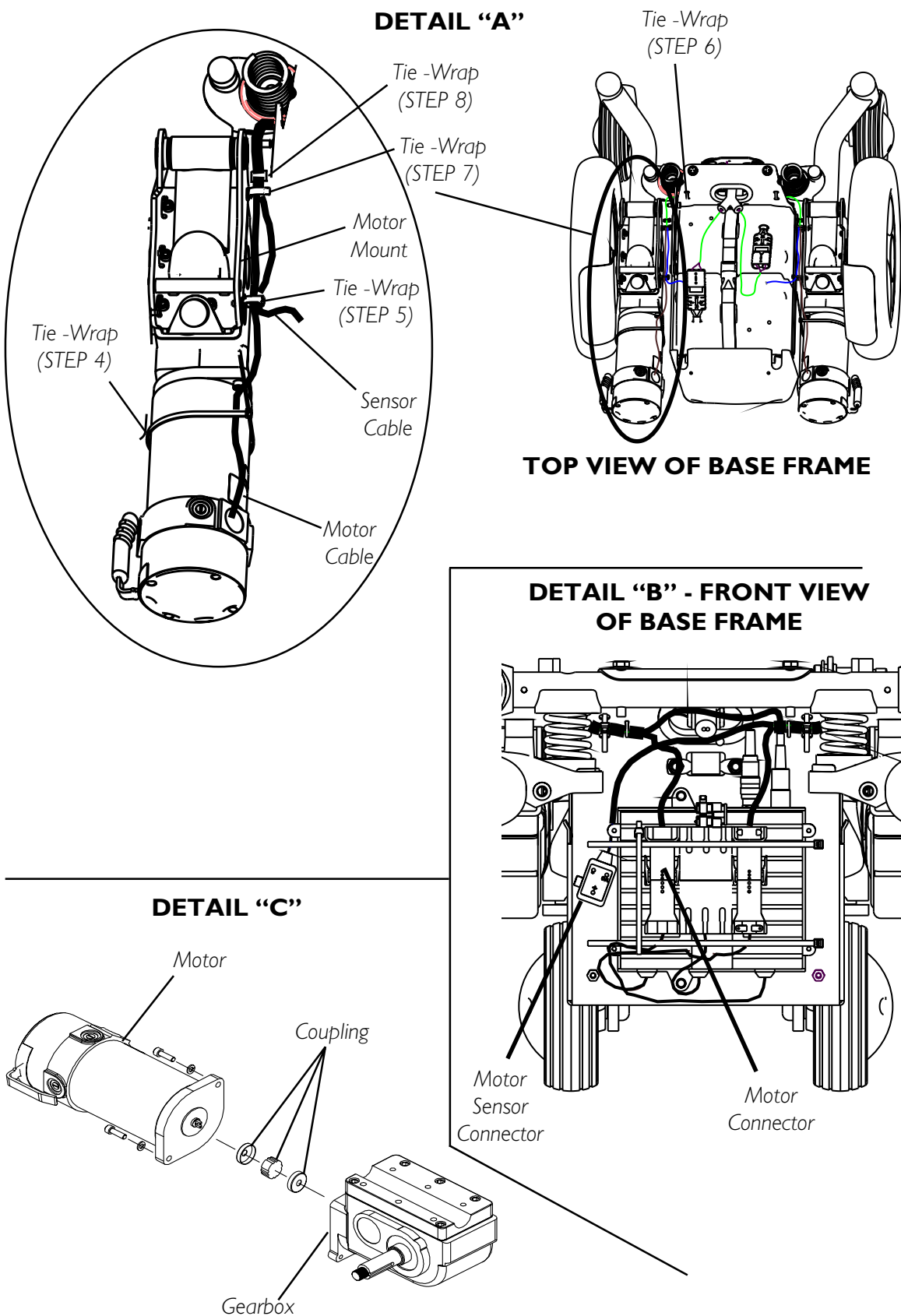
**INSTALLING (FIGURE 3)****WARNING**

**Wiring MUST be routed and secured properly to ensure that wiring does NOT become entangled and damaged during normal operation of wheelchair operation.**

1. Perform the following:
    - A. Inspect the coupling for wear and damage. If damage is evident, replace coupling.
    - B. Install coupling onto gearbox input shaft inserting coupling drive plate onto slot on shaft.
    - C. Carefully align motor and coupling and place motor against gearbox.
    - D. With motor against gearbox, turn gearbox drive shaft until the coupler seats into gearbox.
- NOTE: When properly aligned, motor will be seated into gearbox.*
2. Install two (2) allen screws. Use Loctite 242, tighten allen screws evenly and then torque to 75-inch lbs.
  3. Install the wire harness wrap around the motor/sensor cables.
  4. Feed motor/sensor cable with wire harness wrap down through base frame.
  5. Connect the motor connector to the controller connector and the sensor cable to the power take-off lead.

*NOTE: Re-install the tie-wraps to secure the cables in place.*

6. Secure the wire harness wrap around the motor/sensor cable with two (2) tie-wraps.
7. Secure the motor cable and sensor cable together with a tie-wrap.
8. Secure the wire harness wrap to the battery tray with tie-wrap.
9. Secure the motor cable and sensor cable to the motor mount with tie-wrap.
10. Secure the motor cable to the motor with tie wrap.
11. Install the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUDS in SECTION 7 of this manual.
12. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 6 of this manual.
13. If necessary, reinstall the seat and/or the drive wheels. Refer to REMOVING/INSTALLING DRIVE WHEELS in this section or REMOVING/INSTALLING SEAT FRAME in SECTION 6 of this manual.

**FIGURE 3 - REMOVING/INSTALLING MOTOR**

## REMOVING/INSTALLING MOTOR/GEARBOX, SUSPENSION ARM ASSEMBLY, AND SUSPENSION SPRING HARDWARE

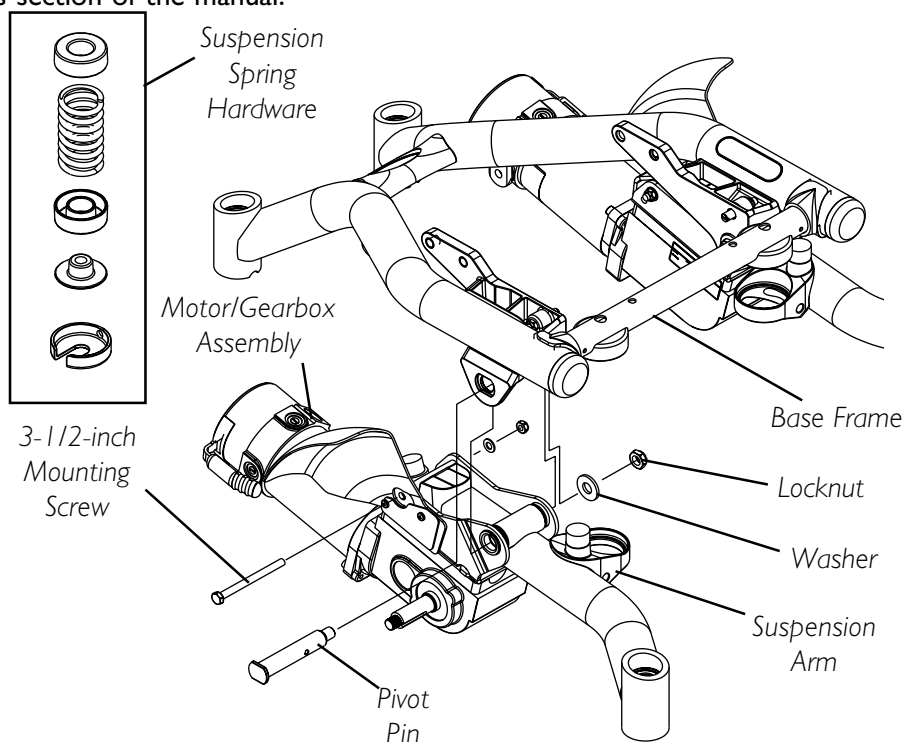
### REMOVING (FIGURE 4)

**NOTE:** This procedure will require a 5-inch mounting screw (with 1-1/2-inches of thread), fender washer, and locknut.

1. Remove the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.
2. Remove the seat from the base frame. Refer to REMOVING/INSTALLING SEATFRAME in SECTION 6 of this manual.
3. Remove the flip-up seat plate. Refer to REMOVING/INSTALLING FLIP-UP SEAT PLATE in SECTION 7 of this manual.
4. Remove the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUDS in SECTION 7 of this manual.
5. Disconnect the motor connector from the controller connector. **NOTE:** A tie-wrap around the controller may need to be removed to make the disconnection.

**NOTE:** Before performing STEP 6, note the location of the tie-wraps removed, on the motor cable, for proper reinstallation of new tie-wraps.

6. Cut the tie-wraps that secure the motor cable in place.
7. Remove the drive wheels. Refer to REMOVING/INSTALLING DRIVE WHEELS in this section of the manual.
8. Remove the drive wheel hub. Refer to REMOVING/INSTALLING DRIVE WHEEL HUB in this section of the manual.



**FIGURE 4 - REMOVING/INSTALLING MOTOR/GEARBOX, SUSPENSION ARM ASSEMBLY, AND SUSPENSION SPRING HARDWARE**

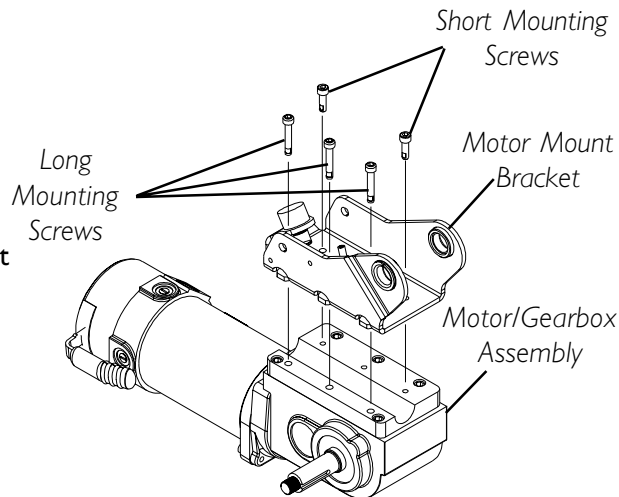
*NOTE: Note that after performing STEPS 8 and 9 that the suspension spring hardware will come off with the suspension arm assembly. Save for reinstallation of motor/gearbox assembly.*

8. Remove the pivot pin, washer and locknut that secures the front of the motor mount and suspension arm to the base frame.
9. Remove the 3-1/2-inch long mounting screw, washer and locknut that secures the rear of the motor mount to the base frame.
10. **For motor/gearbox (FIGURE 5):** Remove the two (2) short mounting screws and three (3) long mounting screws that secure the motor mount bracket to the motor/gearbox assembly.

## INSTALLING (FIGURES 4, 5 AND 6 )

*NOTE: This procedure will require a 5-inch mounting screw (with 1-1/2-inches of thread), fender washer, and locknut.*

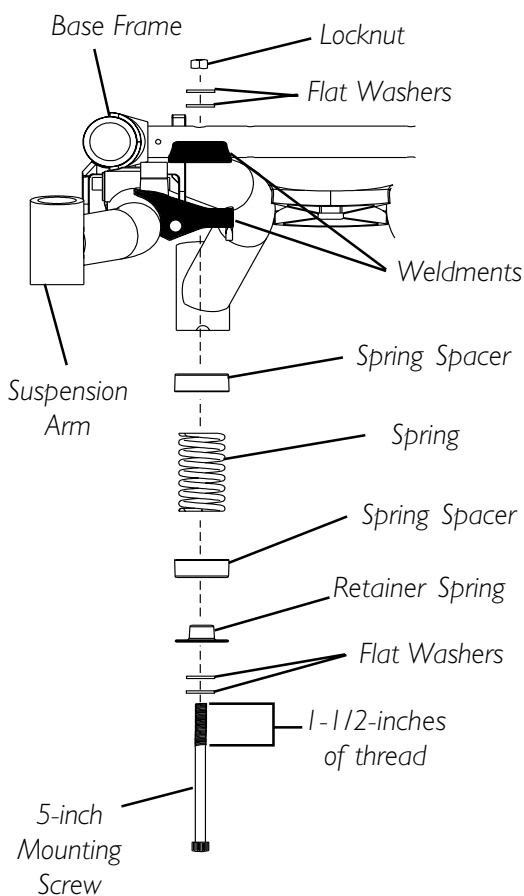
1. Secure the motor mount bracket to the motor/gearbox assembly with two (2) short mounting screws and three (3) long mounting screws. Torque mounting screws to 75-in./lbs. (FIGURE 5)
2. Secure the rear of the motor mount to the suspension arm with the 3-1/2-inch long mounting screw, washer and locknut. Torque to 13 ft/lbs. (FIGURE 4)
3. Secure the front of the motor mount bracket and suspension arm to the base frame with the pivot pin, washer and locknut. Torque locknut to 75-in./lbs. (FIGURE 4)
4. Install the drive wheel hub. Refer to REMOVING/INSTALLING DRIVE WHEEL HUB in this section of the manual.
5. Install the drive wheels. Refer to REMOVING/INSTALLING DRIVE WHEELS in this section of the manual.
6. Connect the motor connector to the controller connector.
7. Re-install all the tie-wraps where noted from the REMOVING process of the motor/gearbox.
8. Install mounting suspension spring components by performing the following: (FIGURE 6)
  - A. Install two (2) flat washers on 5-inch mounting screw (with at least 1-1/2-inches of thread.)
  - B. Thread 5-inch mounting screw through spring retainer, spring spacer, compression spring and spacer.
  - C. Take the spring assembly, completed in STEP B, and feed through hole in suspension arm weldment. Continue pushing mounting screw up through base frame crossmember ensuring that screw end is protruding through the top.
  - D. Install two (2) flat washers and locknut onto mounting screw.



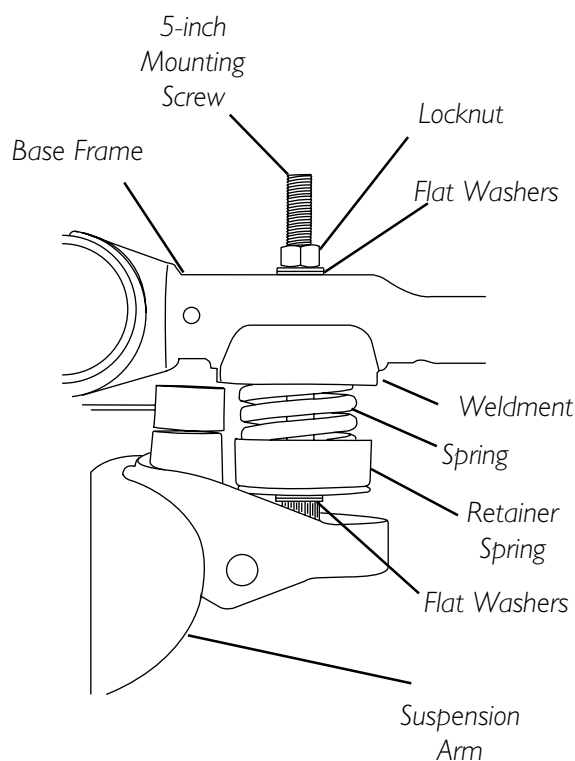
**FIGURE 5 - SECURING MOTOR/GEARBOX TO MOTOR MOUNT**

- E. Tighten locknut down, drawing spring upward, until there is a space wide enough between retainer and suspension arm weldment to slide in lower retainer.
  - F. Once lower retainer is installed, remove mounting screw, washers and locknut. Spring is contained within weldments of base frame crossmember and suspension arm.
9. Install the front shroud. Refer to REMOVING/INSTALLING FRONT AND REAR SHROUD in SECTION 7 of this manual.
  10. Install the flip-up seat plate. Refer REMOVING/INSTALLING FLIP-UP SEAT PLATE in SECTION 7 of this manual.
  11. Install the seat from the base frame. Refer to REMOVING/INSTALLING SEAT in SECTION 6 of this manual.
  12. Install the batteries. Refer to REMOVING/INSTALLING BATTERIES in SECTION 8 of this manual.

### EXPLODED VIEW



### ASSEMBLED VIEW



**FIGURE 6 - REMOVING/INSTALLING MOTOR/GEARBOX, SUSPENSION ARM ASSEMBLY, AND SUSPENSION SPRING HARDWARE**



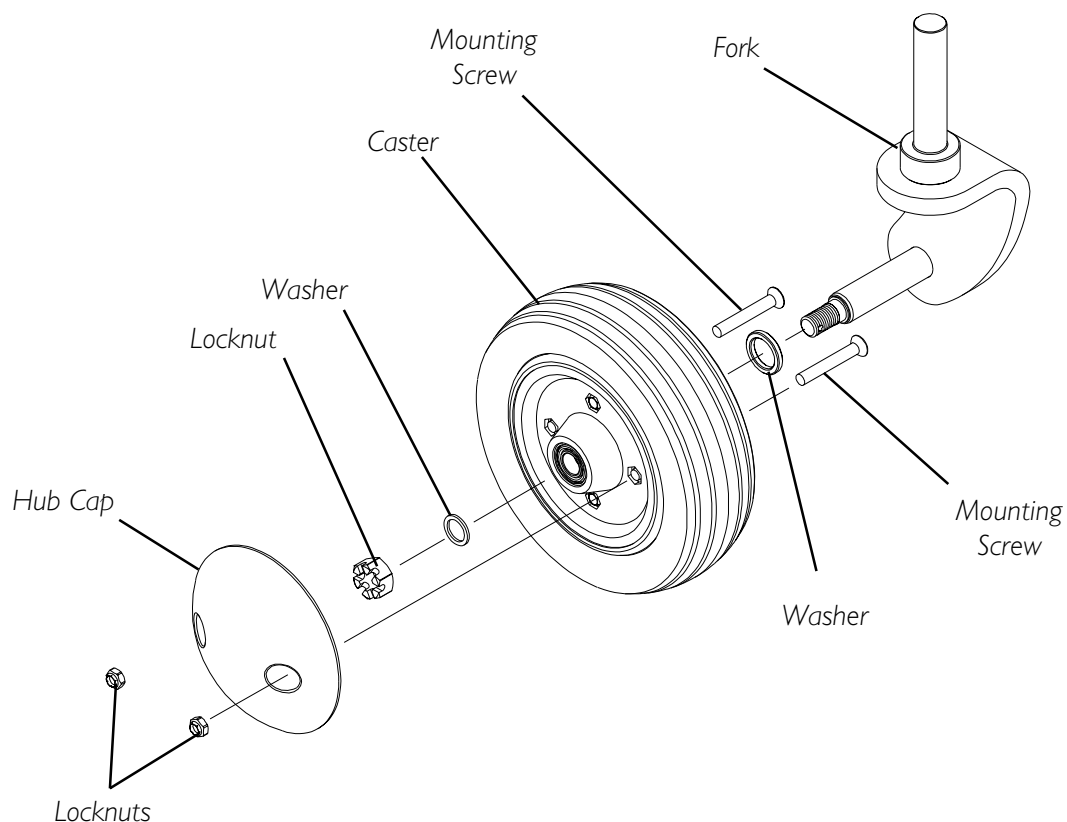
## REMOVING/INSTALLING CASTERS (FIGURE 7)

### REMOVING

1. Remove the two (2) mounting screws and locknuts that secure the hub cap onto the caster.
2. Remove the locknut and washers that secures the caster to the fork.
3. Remove caster.

### INSTALLING

1. Install caster as shown.
2. Secure the caster to the fork with the locknut and washers.
3. Secure the hub cap onto the caster with the two (2) mounting screws and locknuts.  
Torque to 40-in./lbs.  $\pm$  20%.



**FIGURE 7 - REMOVING/INSTALLING CASTERS**

NOTES

NOTES

**LIMITED WARRANTY**

**PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.**

This warranty is extended only to the original purchaser/user of our products.

This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

Invacare warrants seat frame to be free from defects in materials and workmanship for a period of three (3) years from date of purchase; that electrical components are warranted for a period of one (1) year; gearbox/motors for a period of 18 months; and gearless/brushless motors for five (5) years from the date of purchase; and the base frame for the life of the product; all remaining components (including gas cylinders and motor lock pads) for one (1) year from the date of purchase except upholstered materials, padded materials and tires/wheels. If within such warranty period any such product shall be proven to be defective, such product shall be repaired or replaced, at Invacare's option. This warranty does not include any labor or shipping charges incurred in replacement part installation or repair of any such product. Invacare's sole obligation and your exclusive remedy under this warranty shall be limited to such repair and/or replacement.

This warranty pertains to Xterra GT power wheelchair Only!

For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address at the bottom of the back cover. Provide dealer's name, address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

**LIMITATIONS AND EXCLUSIONS: THE FOREGOING WARRANTY SHALL NOT APPLY TO SERIAL NUMBERED PRODUCTS IF THE SERIAL NUMBER HAS BEEN REMOVED OR DEFACED, PRODUCTS SUBJECTED TO NEGLIGENCE, ACCIDENT, IMPROPER OPERATION, MAINTENANCE OR STORAGE, COMMERCIAL OR INSTITUTIONAL USE, PRODUCTS MODIFIED WITHOUT INVACARE'S EXPRESS WRITTEN CONSENT INCLUDING, BUT NOT LIMITED TO, MODIFICATION THROUGH THE USE OF UNAUTHORIZED PARTS OR ATTACHMENTS; PRODUCTS DAMAGED BY REASON OF REPAIRS MADE TO ANY COMPONENT WITHOUT THE SPECIFIC CONSENT OF INVACARE, OR TO A PRODUCT DAMAGED BY CIRCUMSTANCES BEYOND INVACARE'S CONTROL, AND SUCH EVALUATION WILL BE SOLELY DETERMINED BY INVACARE. THE WARRANTY SHALL NOT APPLY TO PROBLEMS ARISING FROM NORMAL WEAR OR FAILURE TO ADHERE TO THESE INSTRUCTIONS.**

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, IF ANY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTY PROVIDED HEREIN AND THE REMEDY FOR VIOLATIONS OF ANY IMPLIED WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT PURSUANT TO THE TERMS CONTAINED HEREIN. INVACARE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES WHATSOEVER.**

**THIS WARRANTY SHALL BE EXTENDED TO COMPLY WITH STATE/PROVINCIAL LAWS AND REQUIREMENTS.**

Invacare Corporation [www.invacare.com](http://www.invacare.com)

---



***Yes, you can.™***

**USA**

One Invacare Way  
Elyria, Ohio USA  
44035-4190  
800-333-6900  
Technical Services  
1-800-832-4707

**Canada**

570 Matheson Blvd E.  
Unit 8 Mississauga, Ontario  
L4Z 4G4, Canada  
800-668-5324

Invacare is a registered trademark of  
Invacare Corporation.  
Yes, you can., Xterra, GT, and MKIV  
are trademarks of Invacare Corporation.  
LOCTITE is a registered trademark of  
Loctite Corporation.  
© 2002 Invacare Corporation  
Part No. 1110516 Rev A -6/02